DC-9

AIRPLANE CHARACTERISTICS FOR AIRPORT PLANNING
JUNE 1984

DOUGLAS AIRCRAFT COMPANY
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>SCOPE</td>
<td>1</td>
</tr>
<tr>
<td>1.1</td>
<td>Purpose</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>Introduction</td>
<td>2</td>
</tr>
<tr>
<td>2.0</td>
<td>AIRPLANE DESCRIPTION</td>
<td>3</td>
</tr>
<tr>
<td>2.1</td>
<td>General Airplane Characteristics</td>
<td>4</td>
</tr>
<tr>
<td>2.2</td>
<td>General Airplane Dimensions</td>
<td>5</td>
</tr>
<tr>
<td>2.3</td>
<td>Ground Clearances</td>
<td>10</td>
</tr>
<tr>
<td>2.4</td>
<td>Interior Arrangements</td>
<td>15</td>
</tr>
<tr>
<td>2.4.1</td>
<td>Passengers</td>
<td>15</td>
</tr>
<tr>
<td>2.4.2</td>
<td>Cargo</td>
<td>19</td>
</tr>
<tr>
<td>2.4.3</td>
<td>Pallet Envelopes</td>
<td>21</td>
</tr>
<tr>
<td>2.5</td>
<td>Passenger Cabin Cross Section</td>
<td>23</td>
</tr>
<tr>
<td>2.5.1</td>
<td>Coach</td>
<td>23</td>
</tr>
<tr>
<td>2.5.2</td>
<td>First Class</td>
<td>24</td>
</tr>
<tr>
<td>2.6</td>
<td>Lower Compartment (No Containers)</td>
<td>25</td>
</tr>
<tr>
<td>2.7</td>
<td>Door Clearances</td>
<td>26</td>
</tr>
<tr>
<td>2.7.1</td>
<td>Lower Forward Cargo Door Clearances</td>
<td>26</td>
</tr>
<tr>
<td>2.7.2</td>
<td>Lower Aft Cargo Door Clearances</td>
<td>27</td>
</tr>
<tr>
<td>2.7.3</td>
<td>Upper Cargo Door Clearances</td>
<td>28</td>
</tr>
<tr>
<td>2.7.4</td>
<td>Passenger Entrance and Service Door Clearances</td>
<td>29</td>
</tr>
<tr>
<td>2.7.5</td>
<td>Main Entrance Stairway Clearances</td>
<td>30</td>
</tr>
<tr>
<td>2.7.6</td>
<td>Forward Passenger Door Opening Clearances</td>
<td>31</td>
</tr>
<tr>
<td>2.7.8</td>
<td>Ventral Stair Clearances</td>
<td>33</td>
</tr>
<tr>
<td>3.0</td>
<td>AIRPLANE PERFORMANCE</td>
<td>35</td>
</tr>
<tr>
<td>3.1</td>
<td>General Information</td>
<td>35</td>
</tr>
<tr>
<td>3.2</td>
<td>Payload Range</td>
<td>36</td>
</tr>
<tr>
<td>3.3</td>
<td>FAR Takeoff Runway Length Requirements</td>
<td>47</td>
</tr>
<tr>
<td>3.4</td>
<td>FAR Landing Runway Length Requirements</td>
<td>51</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>4.0</td>
<td>GROUND MANEUVERING</td>
<td>59</td>
</tr>
<tr>
<td>4.1</td>
<td>General Information</td>
<td>59</td>
</tr>
<tr>
<td>4.2</td>
<td>Turning Radii, No Slip Angle</td>
<td>60</td>
</tr>
<tr>
<td>4.3</td>
<td>Minimum Turning Radii</td>
<td>65</td>
</tr>
<tr>
<td>4.4</td>
<td>Runway and Taxiway Turn Paths</td>
<td>66</td>
</tr>
<tr>
<td>4.4.1</td>
<td>More Than 90 Deg Turn — Runway To Taxiway</td>
<td>66</td>
</tr>
<tr>
<td>4.4.2</td>
<td>90 Deg Turn — Runway to Taxiway</td>
<td>71</td>
</tr>
<tr>
<td>4.4.3</td>
<td>90 Deg Turn — Taxiway to Taxiway — Nose Gear Tracking Beyond Taxiway Centerline</td>
<td>76</td>
</tr>
<tr>
<td>4.4.4</td>
<td>90 Deg Turn — Taxiway to Taxiway — Cockpit Tracks Centerline to Centerline</td>
<td>81</td>
</tr>
<tr>
<td>4.5</td>
<td>Runway Holding Bay (Apron)</td>
<td>86</td>
</tr>
<tr>
<td>5.0</td>
<td>TERMINAL SERVICING</td>
<td>91</td>
</tr>
<tr>
<td>5.1</td>
<td>Airplane Servicing Arrangement (Typical)</td>
<td>91</td>
</tr>
<tr>
<td>5.2</td>
<td>Terminal Operations, Turnaround Station</td>
<td>96</td>
</tr>
<tr>
<td>5.3</td>
<td>Terminal Operations, En Route Station</td>
<td>100</td>
</tr>
<tr>
<td>5.4</td>
<td>Ground Service Connections</td>
<td>104</td>
</tr>
<tr>
<td>5.4.1</td>
<td>Hydraulic System</td>
<td>109</td>
</tr>
<tr>
<td>5.4.2</td>
<td>Electrical System</td>
<td>109</td>
</tr>
<tr>
<td>5.4.3</td>
<td>Oxygen System</td>
<td>109</td>
</tr>
<tr>
<td>5.4.4</td>
<td>Fuel System</td>
<td>109</td>
</tr>
<tr>
<td>5.4.5</td>
<td>Pneumatic System</td>
<td>110</td>
</tr>
<tr>
<td>5.4.6</td>
<td>Potable Water System</td>
<td>110</td>
</tr>
<tr>
<td>5.4.7</td>
<td>Lavatory System</td>
<td>110</td>
</tr>
<tr>
<td>5.4.8</td>
<td>Engine Service System</td>
<td>111</td>
</tr>
<tr>
<td>5.5</td>
<td>Engine Starting Pneumatic Requirements</td>
<td>121</td>
</tr>
<tr>
<td>5.6</td>
<td>Ground Pneumatic Power Requirements</td>
<td>122</td>
</tr>
<tr>
<td>5.7</td>
<td>Preconditioned Airflow Requirements</td>
<td>126</td>
</tr>
<tr>
<td>5.8</td>
<td>Ground Towing Requirements</td>
<td>130</td>
</tr>
<tr>
<td>CONTENTS</td>
<td>Page</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>(Continued)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.0 OPERATING CONDITIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Jet Engine Exhaust Velocities and Temperatures</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>6.1.1 Jet Engine Exhaust Velocity Contours, Breakaway Power</td>
<td>133</td>
<td></td>
</tr>
<tr>
<td>6.1.2 Jet Engine Exhaust Temperature Contours, Breakaway Power</td>
<td>134</td>
<td></td>
</tr>
<tr>
<td>6.1.3 Jet Engine Exhaust Velocity Contours, Takeoff Power</td>
<td>135</td>
<td></td>
</tr>
<tr>
<td>6.1.4 Jet Engine Exhaust Temperature Contours, Takeoff Power</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>6.1.5 Jet Engine Exhaust Velocity Contours, Idle Power</td>
<td>137</td>
<td></td>
</tr>
<tr>
<td>6.1.6 Jet Engine Exhaust Temperature Contours, Idle Power</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>6.2 Airport and Community Noise</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>7.0 PAVEMENT DATA</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>7.1 General Information</td>
<td>141</td>
<td></td>
</tr>
<tr>
<td>7.2 Footprint</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>7.3 Maximum Pavement loads</td>
<td>145</td>
<td></td>
</tr>
<tr>
<td>7.4 Landing Gear Loading on Pavement</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>7.5 Flexible Pavement Requirements, U.S. Corps of Engineers Design Method</td>
<td>151</td>
<td></td>
</tr>
<tr>
<td>7.6 Flexible Pavement Requirements, LCN Conversion</td>
<td>153</td>
<td></td>
</tr>
<tr>
<td>7.7 Rigid Pavement Requirements, Portland Cement Association Design Method</td>
<td>159</td>
<td></td>
</tr>
<tr>
<td>7.8 Rigid Pavement Requirements, LCN Conversion</td>
<td>165</td>
<td></td>
</tr>
<tr>
<td>7.8.1 Radius of Relative Stiffness</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>7.9 ACN-PCN Reporting System: Flexible and Rigid Pavements</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>8.0 POSSIBLE DC-9 DERIVATIVE AIRPLANES</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td>9.0 SCALE DRAWINGS</td>
<td>183</td>
<td></td>
</tr>
<tr>
<td>NO.</td>
<td>REV</td>
<td>DATE</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>i</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>ii</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>iii</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>iv</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>v</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>vi</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>vii</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>l</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>2</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>10</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>12</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>13</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>14</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>15</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>16</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>17</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>18</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>19</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>20</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>21</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>22</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>23</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>24</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>25</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>26</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>27</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>28</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>29</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>30</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>31</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>32</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>33</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>34</td>
<td>Blank</td>
<td>79</td>
</tr>
<tr>
<td>35</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>36</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>37</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>38</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>NO.</td>
<td>REV</td>
<td>DATE</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>174</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>175</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>176</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>177</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>178</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>179</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>180</td>
<td>New</td>
<td>5/84</td>
</tr>
<tr>
<td>181</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>182</td>
<td>Blank</td>
<td>5/84</td>
</tr>
<tr>
<td>183</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>184</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>185</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>186</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>187</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>188</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>189</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>190</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>191</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>192</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>193</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>194</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>195</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>196</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>197</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>198</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>199</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>200</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>201</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>202</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>203</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>204</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>205</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>206</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>207</td>
<td>F</td>
<td>5/84</td>
</tr>
<tr>
<td>208</td>
<td>Blank</td>
<td></td>
</tr>
</tbody>
</table>
1.0 SCOPE

1.1 Purpose
1.2 Introduction
1.0 SCOPE

1.1 Purpose

This document provides, in a standardized format, airplane characteristics data for general airport planning information. There are numerous versions of the model DC-9.* The DC-9 data in this document are for the most critical model in each series considering airport operations. Since operational practices vary among airlines, specific data should be coordinated with the using airlines prior to facility design. The Douglas Aircraft Company should be contacted for any additional information required.

Content of the document reflects the results of a coordinated effort by representatives from the following organizations:

- Aerospace Industries Association of America
- Airport Operators' Council International
- Air Transport Association of America
- International Air Transport Association

*The following DC-9 models have been certified by the FAA to date: DC-9-11, DC-9-12, DC-9-13, DC-9-14, DC-9-15, DC-9-15F, DC-9-21, DC-9-31, DC-9-32, DC-9-32F, DC-9-33F, DC-9-41, and DC-9-51.
1.2 Introduction

This document conforms to NAS 3601. It provides Model DC-9 characteristics for airport operators, airlines, and engineering consultant organizations. Since airplane changes and available options may alter the information, the data presented herein must be regarded as subject to change. Similarly, for airplanes not yet certified, changes can be expected to occur.

For further information, contact:

Boeing Commercial Airplane Group
P.O. Box 3707
Seattle, Washington 98124-2207
USA

Attention: Manager, Airport Technology
Mail Code 67-KR

or

Phone: 425-237-0126
FAX: 425-237-0860
http://www.boeing.com/assocproducts/aircompat/index.htm

Note, this document is available electronically at the following website:
http://www.boeing.com/assocproducts/aircompat/index.htm
2.0 AIRPLANE DESCRIPTION

2.1 General Airplane Characteristics
2.2 General Airplane Dimensions
2.3 Ground Clearances
2.4 Interior Arrangements
2.5 Passenger Cabin Cross Section
2.6 Lower Compartments (No Containers)
2.7 Door Clearances
2.0 AIRPLANE DESCRIPTION

2.1 General Airplane Characteristics — Douglas DC-9 (Definitions Refer to Items in Figure 2.1)

**Maximum Ramp Weight.** Maximum weight authorized for ground maneuver by applicable government regulations, including taxi and runup fuel. Also designated in some manuals as maximum design taxi weight.

**Maximum Landing Weight.** Maximum weight authorized at touchdown by the applicable government regulations.

**Maximum Takeoff Weight.** Maximum weight authorized at takeoff brake release by the applicable government regulations and excludes taxi and runup fuel.

**Operating Weight Empty.** Weight of structure, power plant, furnishings, systems, unusable fuel and other unusable propulsion agents, and other items of equipment that are considered an integral part of a particular aircraft configuration. Also included are certain standard items, personnel, equipment, and supplies necessary for full operation, excluding fuel and payload. Described as “Operating Empty Weight” in some manuals.

**Zero Fuel Weight.** Maximum airplane weight less usable fuel, engine injection fluid, and other consumable propulsion agents. It may include usable fuel in specified tanks when carried in lieu of payload. The addition of usable and consumable items to the Zero Fuel Weight must be in accordance with the applicable government regulations so that airplane structure and airworthiness requirements are not exceeded.

**Maximum Structural Payload.** Consists of the maximum design payload weight of passengers, passenger baggage and/or cargo.

**Maximum Seating Capacity.** The maximum number of passengers specifically certified or anticipated for certification.

**Maximum Cargo Volume.** The maximum space available for cargo.

**Usable Fuel Capacity.** The volume of fuel carried for a particular operation, less drainable unusable fuel and trapped fuel remaining after a fuel runout test has been accomplished.
<table>
<thead>
<tr>
<th><strong>2.1 GENERAL AIRPLANE CHARACTERISTICS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MODEL DC-9-15</strong></td>
</tr>
<tr>
<td><strong>MAXIMUM RAMP WEIGHT</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>MAXIMUM LANDING WEIGHT</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>MAXIMUM TAKEOFF WEIGHT</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>OPERATING WEIGHT EMPTY</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>ZERO FUEL WEIGHT</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>MAXIMUM STRUCTURAL PAYLOAD</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>MAXIMUM SEATING CAPACITY</strong></td>
</tr>
<tr>
<td>SEE PAGES 17 THROUGH 21</td>
</tr>
<tr>
<td><strong>MAXIMUM CARGO VOLUME</strong></td>
</tr>
<tr>
<td>SEE PAGES 22, 23, AND 28</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
2.2 GENERAL AIRPLANE DIMENSIONS

MODEL DC-9-41
2.2 GENERAL AIRPLANE DIMENSIONS
MODEL DC-9-51
### VERTICAL CLEARANCES

<table>
<thead>
<tr>
<th></th>
<th>MAXIMUM</th>
<th></th>
<th>MINIMUM</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT . IN.</td>
<td>METERS</td>
<td>FT . IN.</td>
<td>METERS</td>
</tr>
<tr>
<td>A</td>
<td>7 - 9</td>
<td>2.4</td>
<td>7 - 2</td>
<td>2.2</td>
</tr>
<tr>
<td>B</td>
<td>7 - 4</td>
<td>2.2</td>
<td>7 - 0</td>
<td>2.1</td>
</tr>
<tr>
<td>C</td>
<td>3 - 8</td>
<td>1.1</td>
<td>3 - 3</td>
<td>1.0</td>
</tr>
<tr>
<td>D</td>
<td>9 - 4</td>
<td>2.8</td>
<td>9 - 5</td>
<td>2.9</td>
</tr>
<tr>
<td>E</td>
<td>11 - 6</td>
<td>3.5</td>
<td>11 - 8</td>
<td>3.6</td>
</tr>
<tr>
<td>F</td>
<td>27 - 7</td>
<td>8.4</td>
<td>27 - 5</td>
<td>8.4</td>
</tr>
<tr>
<td>G</td>
<td>7 - 6</td>
<td>2.3</td>
<td>7 - 2</td>
<td>2.2</td>
</tr>
<tr>
<td>H</td>
<td>24 - 8</td>
<td>7.5</td>
<td>24 - 6</td>
<td>7.5</td>
</tr>
<tr>
<td>J</td>
<td>9 - 10</td>
<td>3.0</td>
<td>9 - 7</td>
<td>2.9</td>
</tr>
<tr>
<td>K</td>
<td>3 - 8</td>
<td>1.1</td>
<td>3 - 3</td>
<td>1.0</td>
</tr>
<tr>
<td>L</td>
<td>6 - 8</td>
<td>2.0</td>
<td>6 - 5</td>
<td>2.0</td>
</tr>
<tr>
<td>M</td>
<td>15 - 5</td>
<td>4.7</td>
<td>14 - 9</td>
<td>4.5</td>
</tr>
<tr>
<td>P</td>
<td>3 - 4</td>
<td>1.0</td>
<td>3 - 0</td>
<td>0.9</td>
</tr>
</tbody>
</table>

*It is recommended that approximately ±3 inches (±8 cm) be allowed for vertical excursions due to loading, varying strut and tire inflations, pavement unevenness, etc.*

#### 2.3 GROUND CLEARANCES
**MODEL DC-9-15**
2.3 GROUND CLEARANCES
MODEL DC-9-21

REV F 5/84
2.3 GROUND CLEARANCES
MODEL DC-9-32

<table>
<thead>
<tr>
<th>VERTICAL CLEARANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAXIMUM</td>
</tr>
<tr>
<td>FT - IN.</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>H</td>
</tr>
<tr>
<td>J</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>L</td>
</tr>
<tr>
<td>M</td>
</tr>
<tr>
<td>P</td>
</tr>
</tbody>
</table>

IT IS RECOMMENDED THAT APPROXIMATELY +3 INCHES (+8 cm) BE ALLOWED FOR VERTICAL EXCURSIONS DUE TO LOADING, VARYING STRUT AND TIRE INFLATIONS, PAVEMENT UNEVENNESS, ETC.
VERTICAL CLEARANCES

<table>
<thead>
<tr>
<th></th>
<th>MAXIMUM</th>
<th>MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT-IN.</td>
<td>METERS</td>
</tr>
<tr>
<td>A</td>
<td>7-7</td>
<td>2.3</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>3-7</td>
<td>1.1</td>
</tr>
<tr>
<td>D</td>
<td>9-6</td>
<td>2.9</td>
</tr>
<tr>
<td>E</td>
<td>12-2</td>
<td>3.7</td>
</tr>
<tr>
<td>F</td>
<td>28-5</td>
<td>8.7</td>
</tr>
<tr>
<td>G</td>
<td>7-7</td>
<td>2.3</td>
</tr>
<tr>
<td>H</td>
<td>25-3</td>
<td>7.7</td>
</tr>
<tr>
<td>J</td>
<td>10-5</td>
<td>3.2</td>
</tr>
<tr>
<td>K</td>
<td>4-5</td>
<td>1.3</td>
</tr>
<tr>
<td>L</td>
<td>7-4</td>
<td>2.2</td>
</tr>
<tr>
<td>M</td>
<td>15-6</td>
<td>4.7</td>
</tr>
<tr>
<td>P</td>
<td>3-5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

IT IS RECOMMENDED THAT APPROXIMATELY ±3 INCHES (±7.6 cm) BE ALLOWED FOR VERTICAL EXCURSIONS DUE TO LOADING, VARYING STRUT AND TIRE INFLATIONS, PAVEMENT UNEVENNESS, ETC.

2.3 GROUND CLEARANCES
MODEL DC-9-41
### VERTICAL CLEARANCES

<table>
<thead>
<tr>
<th></th>
<th>MAXIMUM</th>
<th>MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT - IN.</td>
<td>METERS</td>
</tr>
<tr>
<td>A</td>
<td>7 - 8</td>
<td>2.3</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>C</td>
<td>3 - 8</td>
<td>1.1</td>
</tr>
<tr>
<td>D</td>
<td>9 - 4</td>
<td>2.8</td>
</tr>
<tr>
<td>E</td>
<td>12 - 5</td>
<td>3.8</td>
</tr>
<tr>
<td>F</td>
<td>28 - 9</td>
<td>8.8</td>
</tr>
<tr>
<td>G</td>
<td>7 - 5</td>
<td>2.3</td>
</tr>
<tr>
<td>H</td>
<td>25 - 7</td>
<td>7.8</td>
</tr>
<tr>
<td>J</td>
<td>10 - 5</td>
<td>3.2</td>
</tr>
<tr>
<td>K</td>
<td>4 - 5</td>
<td>1.3</td>
</tr>
<tr>
<td>L</td>
<td>7 - 3</td>
<td>2.2</td>
</tr>
<tr>
<td>M</td>
<td>15 - 4</td>
<td>4.7</td>
</tr>
<tr>
<td>P</td>
<td>3 - 5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*IT IS RECOMMENDED THAT APPROXIMATELY ±3 INCHES (±8 cm) BE ALLOWED FOR VERTICAL EXCURSIONS DUE TO LOADING, VARYING STRUT AND TIRE INFLATIONS, PAVEMENT UNEVENNESS, ETC.*

### 2.3 GROUND CLEARANCES

**MODEL DC-9-51**
90 PASSENGERS, 5-ABREAST SEATING

50 SEATS ON 32 IN. (81.3 CM) PITCH
40 SEATS ON 31 IN. (78.7 CM) PITCH

NOTE: MAXIMUM OF 90 PASSENGERS, 5-ABREAST SEATING AVAILABLE

2.4 INTERIOR ARRANGEMENTS
2.4.1 PASSENGERS
MODEL DC-9-15 AND -21
115 PASSENGERS, 5-ABREAST SEATING
55 SEATS ON 33 IN. (83.8 CM) PITCH
10 SEATS ON 36 IN. (91.4 CM) PITCH
50 SEATS ON 31 IN. (78.7 CM) PITCH

SERVICE DOOR (A)
27 x 48 IN.
(69 x 122 CM)
TYPE I

GALLEY

CREW STORAGE

ATTENDANT DOUBLE SEAT

MAIN ENTRY DOOR (B)
34 x 72 IN.
(86 x 183 CM)
TYPE I

EMERGENCY EXITS
20 x 36 IN.
(51 x 91 CM)
TYPE III

LAVATORY

ATTENDANT DOUBLE SEAT

LAVATORY

NOTE: MAXIMUM OF 127 PASSENGERS, 5-ABREAST SEATING AVAILABLE

2.4 INTERIOR ARRANGEMENTS
2.4.1 PASSENGERS
MODEL DC-9-32
2.4 INTERIOR ARRANGEMENTS
2.4.1 PASSENGERS
MODEL DC-9-41

125 PASSENGERS, 5-ABREAST SEATING
65 SEATS ON 34 IN. (86.4 CM) PITCH
5 SEATS ON 33 IN. (83.8 CM) PITCH
30 SEATS ON 32 IN. (81.3 CM) PITCH
25 SEATS ON 31 IN. (78.7 CM) PITCH

CREW STORAGE
GALLEY
SERVICE DOOR (A)
27 x 48 IN.
(69 x 122 CM)

MAIN ENTRY DOOR (B)
34 x 72 IN.
(86 x 183 CM)

ATTENDANT DOUBLE SEAT

NOTE: MAXIMUM OF 128 PASSENGERS, 5-ABREAST SEATING AVAILABLE

EMERGENCY EXITS
20 x 36 IN.
(51 x 91 CM)
TYPE III

LAVATORY
ATTENDANT DOUBLE SEAT

SCALE
0 2 4 6 M
0 10 20 FT
2.4 INTERIOR ARRANGEMENTS

2.4.1 PASSENGERS

MODEL DC-9-51

135 PASSENGERS, 5-ABREAST SEATING

5 SEATS ON 35-IN. (88.9 CM) PITCH
5 SEATS ON 34-IN. (86.4 CM) PITCH
65 SEATS ON 33-IN. (83.8 CM) PITCH
60 SEATS ON 32-IN. (81.3 CM) PITCH

EMERGENCY EXITS
20 x 36 IN. (51 x 91 CM)
TYPE III

LAVATORY
ATTENDANT DOUBLE SEAT

MAIN ENTRY DOOR (B)
34 x 72 IN.
(86 x 183 CM)
TYPE I

CREW STORAGE
GALLEY
SERVICE DOOR (A)
27 x 48 IN.
(69 x 122 CM)
TYPE I

NOTE: MAXIMUM OF 139 PASSENGERS, 5-ABREAST SEATING AVAILABLE
2.4 INTERIOR ARRANGEMENTS

2.4.2 CARGO

MODEL DC-9-15F
2.4 INTERIOR ARRANGEMENTS
2.4.2 CARGO
MODEL DC-9-32F
2.4 INTERIOR ARRANGEMENTS

2.4.3 PALLET ENVELOPE - CONSTANT SECTION

DC-9-15 FREIGHTER
2.4 INTERIOR ARRANGEMENTS

2.4.3 PALLET ENVELOPE - CONSTANT SECTION

DC-9-32 FREIGHTER
2.5 PASSENGER CABIN CROSS SECTION
2.5.1 COACH - MODEL DC-9

*FLAT FLOOR STANDARD ON DC-9-80, OPTIONAL ON ALL OTHER SERIES
2.5 PASSENGER CABIN CROSS SECTION
2.5.2 FIRST CLASS - MODEL DC-9
<table>
<thead>
<tr>
<th>MODEL DC-9</th>
<th>FORWARD CARGO COMPARTMENT</th>
<th>AFT CARGO COMPARTMENT</th>
<th>TOTAL CARGO</th>
</tr>
</thead>
<tbody>
<tr>
<td>-15</td>
<td>373 CU FT (10.56 CU M)</td>
<td>227 CU FT (6.43 CU M)</td>
<td>600 CU FT (17.00 CU M)</td>
</tr>
<tr>
<td>-21</td>
<td>373 CU FT (10.56 CU M)</td>
<td>227 CU FT (6.43 CU M)</td>
<td>600 CU FT (17.00 CU M)</td>
</tr>
<tr>
<td>-32</td>
<td>562 CU FT (15.91 CU M)</td>
<td>333 CU FT (9.43 CU M)</td>
<td>895 CU FT (25.34 CU M)</td>
</tr>
<tr>
<td>-41</td>
<td>624 CU FT (17.67 CU M)</td>
<td>395 CU FT (11.19 CU M)</td>
<td>1019 CU FT (28.86 CU M)</td>
</tr>
<tr>
<td>-51</td>
<td>717 CU FT (20.30 CU M)</td>
<td>457 CU FT (12.94 CU M)</td>
<td>1174 CU FT (33.24 CU M)</td>
</tr>
</tbody>
</table>

*WITHOUT FUSELAGE AUXILIARY FUEL TANKS

2.6 LOWER COMPARTMENTS (NO CONTAINERS)
MODEL DC-9
(SERIES 15 THROUGH 51)
2.7 DOOR CLEARANCES

2.7.1 LOWER FORWARD CARGO DOOR CLEARANCES
MODEL DC-9
(SERIES 15 THROUGH 51)
2.7 DOOR CLEARANCES

2.7.2 LOWER AFT CARGO DOOR CLEARANCES
MODEL DC-9
(SERIES 15 THROUGH 51)
2.7 DOOR CLEARANCES
2.7.3 UPPER CARGO DOOR CLEARANCES
(MODEL DC-9-15 AND -32)
2.7 DOOR CLEARANCES

2.7.4 PASSENGER ENTRANCE AND SERVICE

DOOR CLEARANCES

MODEL DC-9
2.7 DOOR CLEARANCES
2.7.5 MAIN ENTRANCE STAIRWAY CLEARANCES
MODEL DC-9
2.7 DOOR CLEARANCES
2.7.6 FORWARD PASSENGER DOOR OPENING CLEARANCES
MODEL DC-9
2.7 DOOR CLEARANCES
2.7.6 FORWARD PASSENGER DOOR OPENING CLEARANCES
MODEL DC-9
2.7 DOOR CLEARANCES
2.7.8 VENTRAL STAIR CLEARANCES
MODEL DC-9
(SERIES 15 THROUGH 51)

*VARIES WITH MODEL, WEIGHT, CG LOCATION, AND LANDING GEAR STRUT COMPRESSION.
3.0 AIRPLANE PERFORMANCE

3.1 General Information
3.2 Payload Range
3.3 FAR Takeoff Runway Length Requirements
3.4 FAR Landing Runway Length Requirements
3.0 TAKEOFF AND LANDING REQUIREMENTS

3.1 General Information

Figure 3.2 presents payload-range information for a specific long-range cruise altitude and at the fuel reserve condition shown.

Figures 3.3 and 3.4 represent FAR takeoff and landing field length requirements for FAA certification.

Standard day temperatures for the altitudes shown are tabulated below:

<table>
<thead>
<tr>
<th>ELEVATION</th>
<th>STANDARD DAY TEMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEET</td>
<td>METERS</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2000</td>
<td>610</td>
</tr>
<tr>
<td>4000</td>
<td>1219</td>
</tr>
<tr>
<td>6000</td>
<td>1829</td>
</tr>
<tr>
<td>8000</td>
<td>2438</td>
</tr>
</tbody>
</table>

NOTE: Information presented for standard engines for given model. Engine options are available.
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR LONG-RANGE CRUISE AT 30,000 FT
MODEL DC-9-15
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR LONG-RANGE CRUISE AT 9,150 METERS
DC-9-15
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR LONG-RANGE CRUISE AT 9,150 METERS
DC-9-15
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 30,000 FT
MODEL DC-9-21
3.2 PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 9150 METERS

MODEL DC-9-21
NOTE: DOMESTIC RESERVES AT
200 NAUTICAL MILES ALTERNATE
PLUS 45 MINUTES AT LRC

- STANDARD DAY
- NO WIND
- OEW = 25,789 KG
- JT8D-7 ENGINES

3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 9,150 METERS
MODEL DC-9-32
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 30,000 FT
MODEL DC-9-32
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 30,000 FT
MODEL DC-9-41
3.2 PAYLOAD-RANGE
PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 9,150 METERS
MODEL DC-9-41
3.2 PAYLOAD-RANGE

PAYLOAD-RANGE FOR TYPICAL LONG-RANGE CRUISE AT 30,000 FT
MODEL DC-9-51
3.2 Payload-Range

Payload-range for typical long-range cruise at 9,150 meters
Model DC-9-51

NOTE: DOMESTIC RESERVES AT
200 NAUTICAL MILES ALTERNATE
PLUS 45 MINUTES AT LRC

DESIGN PAYLOAD
16,545 KG

MAX TAKING OFF WEIGHT
55,428 KG

135 PASSENGERS AND BAGGAGE

PAYLOAD (1000 KG)

RANGE (100 NAUTICAL MILES)

- STANDARD DAY
- NO WIND
- OEW = 29,338 KG
- JT8D-17 ENGINES
3.3 FAR TAKEOFF RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-15
3.3 FAR TAKEOFF RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-21

NOTES:
- JTBD-11 ENGINES
- MAX TAKEOFF POWER
- ZERO RUNWAY GRADIENT
- ZERO WIND

- COORDINATE WITH USING AIRLINE FOR SPECIFIC REQUIREMENTS PRIOR TO FACILITY DESIGN

*ENGINE FLAT RATED TEMPERATURE
TAKEOFF GROSS WEIGHT

STD DAY +15°C*
AIRPORT ALTITUDE
8000 FT (2438 M)
6000 FT (1829 M)
4000 FT (1219 M)
2000 FT (610 M)
MAXIMUM TAKEOFF WEIGHT 98,000 LB

SEA LEVEL

(1000 LB)
32 34 36 38 40 42 44 (1000 KG)

TAKING OFF GROSS WEIGHT

(1000 KG)

70 75 80 85 90 95 100

0 2 4 6 8 10 12

STD DAY
AIRPORT ALTITUDE
8000 FT (2438 M)
6000 FT (1829 M)
4000 FT (1219 M)
2000 FT (610 M)
MAXIMUM TAKEOFF WEIGHT 98,000 LB

SEA LEVEL

(1000 LB)
32 34 36 38 40 42 44 (1000 KG)
3.3 FAR TAKEOFF RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-32
3.3 FAR TAKEOFF RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-41
3.3 FAR TAKEOFF RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-51
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-15
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-21
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-32
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-32
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-41
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-41
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-51
3.4 FAR LANDING RUNWAY LENGTH REQUIREMENTS
MODEL DC-9-51
4.0 GROUND MANEUVERING

4.1 General Information
4.2 Turning Radii, No Slip Angle
4.3 Minimum Turning Radii
4.4 Runway and Taxiway Turn Paths
4.5 Runway Holding Bay (Apron)
4.0 GROUND MANEUVERING

4.1 General Information

This section provides airplane turning capability and maneuvering characteristics.

For ease of presentation, this data has been determined from the theoretical limits imposed by the geometry of the aircraft, and where noted, provides for a normal allowance for tire slippage. As such, it reflects the turning capability of the aircraft in favorable operating circumstances. This data should only be used as guidelines for the method of determination of such parameters and for the maneuvering characteristics of this aircraft type.

In the ground operating mode, varying airline practices may demand that more conservative turning procedures be adopted to avoid excessive tire wear and reduce possible maintenance problems. Airline operating techniques will vary, in the level of performance, over a wide range of operating circumstances throughout the world. Variations from standard aircraft operating patterns may be necessary to satisfy physical constraints within the maneuvering area, such as adverse grades, limited area or high risk of jet blast damage. For these reasons, ground maneuvering requirements should be coordinated with the using airlines prior to layout planning.
4.2 TURNING RADIUS, NO SLIP ANGLE
MODEL DC-9-15
4.2 TURNING RADIi, NO SLIP ANGLE
MODEL DC-9-21
### Turning Radii Depicted

Represent theoretical geometric turn centers.

### Turning Center (Typical)

For nose gear turning angle as shown.

### Steering Angle Degrees (Typ).

NOTE:

Actual operating data will be greater than values shown since tire slippage is not considered in these calculations. Consult airline for operating procedures.

<table>
<thead>
<tr>
<th>Steering Angle (Degrees)</th>
<th>R-1</th>
<th>R-2</th>
<th>R-3*</th>
<th>R-4</th>
<th>R-5</th>
<th>R-6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT</td>
<td>M</td>
<td>FT</td>
<td>M</td>
<td>FT</td>
<td>M</td>
</tr>
<tr>
<td>30</td>
<td>83.9</td>
<td>25.6</td>
<td>100.3</td>
<td>30.6</td>
<td>107.1</td>
<td>32.6</td>
</tr>
<tr>
<td>45</td>
<td>45.0</td>
<td>13.7</td>
<td>61.3</td>
<td>18.7</td>
<td>76.0</td>
<td>23.1</td>
</tr>
<tr>
<td>50</td>
<td>36.4</td>
<td>11.1</td>
<td>52.8</td>
<td>16.1</td>
<td>70.2</td>
<td>21.4</td>
</tr>
<tr>
<td>55</td>
<td>29.1</td>
<td>8.9</td>
<td>45.4</td>
<td>13.8</td>
<td>65.7</td>
<td>20.0</td>
</tr>
<tr>
<td>60</td>
<td>22.5</td>
<td>6.9</td>
<td>38.9</td>
<td>11.9</td>
<td>62.2</td>
<td>19.0</td>
</tr>
<tr>
<td>65</td>
<td>16.6</td>
<td>5.1</td>
<td>33.0</td>
<td>10.1</td>
<td>59.5</td>
<td>18.1</td>
</tr>
<tr>
<td>70</td>
<td>11.2</td>
<td>3.4</td>
<td>27.5</td>
<td>8.4</td>
<td>57.4</td>
<td>17.5</td>
</tr>
<tr>
<td>75</td>
<td>6.1</td>
<td>1.9</td>
<td>22.4</td>
<td>6.8</td>
<td>55.8</td>
<td>17.0</td>
</tr>
<tr>
<td>82 Maximum</td>
<td>-0.7</td>
<td>-0.2</td>
<td>15.6</td>
<td>4.8</td>
<td>54.5</td>
<td>16.6</td>
</tr>
</tbody>
</table>

* R-3 is measured to outside tire face.

### 4.2 Turning Radii, No Slip Angle

Model DC-9-32
4.2 TURNING RADIUS, NO SLIP ANGLE
MODEL DC-9-41
4.2 TURNING RADIUS, NO SLIP ANGLE
MODEL DC-9-51

REV 5/84
NOTE:
- 3° TIRE SLIP ANGLE ASSUMES 82° NOSE WHEEL DEFLECTION DURING VERY SLOW TURNING
- CONSULT AIRLINE FOR ACTUAL OPERATING DATA
- NO DIFFERENTIAL BRAKING OR UNSYMMETRICAL THRUST

<table>
<thead>
<tr>
<th>DC-9</th>
<th>EFFECTIVE TURN ANGLE</th>
<th>X</th>
<th>Y</th>
<th>A</th>
<th>R3</th>
<th>R4</th>
<th>R5</th>
<th>R6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT</td>
<td>M</td>
<td>FT</td>
<td>M</td>
<td>FT</td>
<td>M</td>
<td>FT</td>
<td>M</td>
</tr>
<tr>
<td>-15</td>
<td>79°</td>
<td>43.7</td>
<td>13.3</td>
<td>8.5</td>
<td>2.6</td>
<td>63.7</td>
<td>19.4</td>
<td>45.4</td>
</tr>
<tr>
<td>-21</td>
<td>79°</td>
<td>43.7</td>
<td>13.3</td>
<td>8.5</td>
<td>2.6</td>
<td>63.7</td>
<td>19.4</td>
<td>45.4</td>
</tr>
<tr>
<td>-32</td>
<td>79°</td>
<td>53.2</td>
<td>16.2</td>
<td>10.3</td>
<td>3.1</td>
<td>75.2</td>
<td>22.9</td>
<td>55.1</td>
</tr>
<tr>
<td>-41</td>
<td>79°</td>
<td>56.2</td>
<td>17.1</td>
<td>10.9</td>
<td>3.3</td>
<td>78.9</td>
<td>24.0</td>
<td>58.2</td>
</tr>
<tr>
<td>-51</td>
<td>79°</td>
<td>60.9</td>
<td>18.6</td>
<td>11.8</td>
<td>3.6</td>
<td>84.5</td>
<td>25.8</td>
<td>62.0</td>
</tr>
<tr>
<td>-80</td>
<td>79°</td>
<td>72.4</td>
<td>22.1</td>
<td>14.0</td>
<td>4.3</td>
<td>98.8</td>
<td>30.1</td>
<td>73.6</td>
</tr>
</tbody>
</table>

4.3 MINIMUM TURNING RADII
MODEL DC-9
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

• NOSE GEAR STEERING ANGLE = 16°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.1 MORE THAN 90° TURN – RUNWAY TO TAXIWAY TURN
MODEL DC-9-15
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

• NOSE GEAR STEERING ANGLE = 16°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.1 MORE THAN 90° TURN – RUNWAY TO TAXIWAY TURN
MODEL DC-9-21
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

* NOSE GEAR STEERING ANGLE = 19°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.1 MORE THAN 90° TURN – RUNWAY TO TAXIWAY TURN
MODEL DC-9-32
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

● NOSE GEAR STEERING ANGLE = 20°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.1 MORE THAN 90° TURN — RUNWAY TO TAXIWAY TURN
MODEL DC-9-41
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 22°
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

• NOSE GEAR STEERING ANGLE = 14°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.2 90° TURN – RUNWAY TO TAXIWAY
MODEL DC-9-15
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 14°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.2 90° TURN - RUNWAY TO TAXIWAY
MODEL DC-9-21
4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.2 90° TURN - RUNWAY TO TAXIWAY
MODEL DC-9-32

NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 17°
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 18°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.2 90° TURN - RUNWAY TO TAXIWAY
MODEL DC-9-41
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 19°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.2 90° TURN - RUNWAY TO TAXIWAY MODEL DC-9-51
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

• NOSE GEAR STEERING ANGLE = 18°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.3 90° TURN – TAXIWAY TO TAXIWAY
MODEL DC-9-15
NOSE GEAR TRACKING
BEYOND TAXIWAY CENTERLINE
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 18°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.3 90° TURN - TAXIWAY TO TAXIWAY
MODEL DC-9-21

NOSE GEAR TRACKING
BEYOND TAXIWAY CENTERLINE
NOTE:
Before determining the size of the intersection fillet, check with the airlines regarding the operating procedures which they use and the aircraft types which are expected to serve the airport.

• Nose gear steering angle = 21°

---

4.4 Runaway and Taxiway Turn Paths
4.4.3 90° Turn – Taxiway to Taxiway
Model DC-9-32

Nose gear tracking
Beyond taxiway centerline
NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 22°

4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.3 90° TURN – TAXIWAY TO TAXIWAY
MODEL DC-9-41
NOSE GEAR TRACKING
BEYOND TAXIWAY CENTERLINE
4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.3  90° TURN – TAXIWAY TO TAXIWAY

MODEL DC-9-51

NOSE GEAR TRACKING
BEYOND TAXIWAY CENTERLINE

NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- NOSE GEAR STEERING ANGLE = 24°
4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.4 90° TURN - TAXIWAY TO TAXIWAY

MODEL DC-9-15

COCKPIT TRACKS
CENTERLINE TO CENTERLINE
4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.4 90° TURN - TAXIWAY TO TAXIWAY
MODEL DC-9-21
COCKPIT TRACKS
CENTERLINE TO CENTERLINE

NOTE:
BEFORE DETERMINING THE SIZE OF THE INTERSECTION FILLET, CHECK WITH THE AIRLINES REGARDING THE OPERATING PROCEDURES WHICH THEY USE AND THE AIRCRAFT TYPES WHICH ARE EXPECTED TO SERVE THE AIRPORT.

- SYMMETRICAL THRUST
- MID-CG
4.4 RUNWAY AND TAXIWAY TURN PATHS

4.4.4 90° TURN – TAXIWAY TO TAXIWAY
MODEL DC-9-32

COCKPIT TRACKS
CENTERLINE TO CENTERLINE
4.4 RUNWAY AND TAXIWAY TURN PATHS

4.4.4 90° TURN – TAXIWAY TO TAXIWAY
MODEL DC-9-41

COCKPIT TRACKS
CENTERLINE TO CENTERLINE
4.4 RUNWAY AND TAXIWAY TURN PATHS
4.4.4 90° TURN - TAXIWAY TO TAXIWAY
MODEL DC-9-51

COCKPIT TRACKS
CENTERLINE TO CENTERLINE
4.5 RUNWAY HOLDING BAY (APRON)
MODEL DC-9-15
*MINIMUM CLEARANCE FOR MOVING AIRCRAFT = 40 FT (12.2 M)

NOTE:
COORDINATE WITH USING AIRLINES FOR SPECIFIC REQUIREMENTS PRIOR TO FACILITY DESIGN

4.5 RUNWAY HOLDING BAY (APRON)
MODEL DC-9-21
4.5 RUNWAY HOLDING BAY (APRON)
MODEL DC-9-32

*MINIMUM CLEARANCE FOR MOVING AIRCRAFT = 40 FT (12.2 M)

NOTE:
COORDINATE WITH USING AIRLINES FOR SPECIFIC REQUIREMENTS PRIOR TO FACILITY DESIGN
4.5 RUNWAY HOLDING BAY (APRON)
MODEL DC-9-41

*MINIMUM CLEARANCE FOR MOVING AIRCRAFT = 40 FT (12.2 M)

NOTE:
COORDINATE WITH USING AIRLINES FOR SPECIFIC REQUIREMENTS PRIOR TO FACILITY DESIGN

REV F 5/84
*MINIMUM CLEARANCE FOR MOVING AIRCRAFT = 40 FT (12.2 M)

NOTE:
COORDINATE WITH USING AIRLINES FOR SPECIFIC REQUIREMENTS PRIOR TO FACILITY DESIGN

4.5 RUNWAY HOLDING BAY (APRON)
MODEL DC-9-51
5.0 TERMINAL SERVICING

5.1 Airplane Servicing Arrangement (Typical)
5.2 Terminal Operations, Turnaround Station
5.3 Terminal Operations, En Route Station
5.4 Ground Service Connections
5.5 Ground Service Connection Data
5.6 Engine Starting Pneumatic Requirements
5.7 Ground Pneumatic Power Requirements
5.8 Preconditioned Airflow Requirements
5.9 Ground Towing Requirements
5.0 TERMINAL SERVICING

5.1 AIRPLANE SERVICING ARRANGEMENT (TYPICAL)
MODEL DC-9-15

AUXILIARY POWER UNIT PROVIDES
1. ELECTRICAL POWER
2. ENGINE START
3. AIR CONDITIONING

REV 5/84 91
5.1 AIRPLANE SERVICING ARRANGEMENT (TYPICAL)
MODEL DC-9-21

AUXILIARY POWER UNIT PROVIDES
1. ELECTRICAL POWER
2. ENGINE START
3. AIR CONDITIONING
5.1 AIRPLANE SERVICING ARRANGEMENT (TYPICAL)
MODEL DC-9-32

AUXILIARY POWER UNIT PROVIDES
1. ELECTRICAL POWER
2. ENGINE START
3. AIR CONDITIONING
5.1 AIRPLANE SERVICING ARRANGEMENT (TYPICAL)
MODEL DC-9-41
5.1 AIRPLANE SERVICING ARRANGEMENT (TYPICAL)  
MODEL DC-9-51
<table>
<thead>
<tr>
<th>Task</th>
<th>Time (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINE SHUTDOWN</td>
<td>1.0</td>
</tr>
<tr>
<td>UNLOAD BAGGAGE/CARGO</td>
<td>6.3</td>
</tr>
<tr>
<td>DEPLANL PASSENGERS&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td>3.5</td>
</tr>
<tr>
<td>SERVICE WASTE TANKS</td>
<td>3.0</td>
</tr>
<tr>
<td>SERVICE POTABLE WATER</td>
<td>5.0</td>
</tr>
<tr>
<td>SERVICE GALLEYS</td>
<td>8.3</td>
</tr>
<tr>
<td>SERVICE AIRPLANE INTERIOR</td>
<td>8.2</td>
</tr>
<tr>
<td>FUEL AIRPLANE&lt;sup&gt;4&lt;/sup&gt; (=1,300 N MI)</td>
<td>7.0</td>
</tr>
<tr>
<td>LOAD CARGO/BAGGAGE&lt;sup&gt;1&lt;/sup&gt;</td>
<td>7.1</td>
</tr>
<tr>
<td>LOAD PASSENGERS&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td>4.1</td>
</tr>
<tr>
<td>MONITOR ENGINE START</td>
<td>2.0</td>
</tr>
<tr>
<td>CLEAR AIRPLANE FOR DEPARTURE</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Critical time path
Vehicle movement

<sup>1</sup> Time available for 680 lb of bulk cargo

<sup>2</sup> Passenger enplane and deplane via front airstair and ventral stairs

<sup>3</sup> An additional 2.0 minutes required for bridge operations

<sup>4</sup> Additional time required for fueling if auxiliary tanks or 35 PSIG system pressure are used.

---

NOTE: ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER. THIS DATA IS PROVIDED TO ILLUSTRATE THE GENERAL SCOPE AND TYPES OF TASKS INVOLVED IN TERMINAL OPERATIONS, VARYING AIRLINE PRACTICES AND OPERATING CIRCUMSTANCES THROUGHOUT THE WORLD WILL RESULT IN DIFFERENT SEQUENCES AND TIME INTERVALS TO ACCOMPLISH THE TASKS SHOWN.

BECAUSE OF THIS, GROUND OPERATIONS REQUIREMENTS SHOULD BE COORDINATED WITH THE USING AIRLINES PRIOR TO RAMP PLANNING.

---

5.2 TERMINAL OPERATIONS TURNAROUND STATION
MODEL DC-9-15 AND 21
ENGINE SHUTDOWN 1.0
UNLOAD BAGGAGE/CARGO1 8.3
DEPLANES PASSENGERS2,3 4.5
SERVICE WASTE TANKS 3.0
SERVICE POTABLE WATER 5.0
SERVICE GALLEYS 10.6
SERVICE AIRPLANE INTERIOR 10.2
FUEL AIRPLANE4 (≈1,300 N MI) 7.0
LOAD CARGO/BAGGAGE1 9.2
LOAD PASSENGERS2,3 5.2
MONITOR ENGINE START 2.0
CLEAR AIRPLANE FOR DEPARTURE 1.4

---

Critical time path
Vehicle movement

- Tourist class configuration with 115 passengers
- 100-percent load factor
- Two baggage/cargo crews

---

1 Time available for 1,080 lb of bulk cargo
2 Passenger enplane and deplane via front airstair and ventral stairs
3 An additional 2.6 minutes required for bridge operations
4 Additional time required for fueling if auxiliary tanks or PSIG system pressure are used.

---

NOTE: ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

THIS DATA IS PROVIDED TO ILLUSTRATE THE GENERAL SCOPE AND TYPES OF TASKS INVOLVED IN TERMINAL OPERATIONS. VARYING AIRLINE PRACTICES AND OPERATING CIRCUMSTANCES THROUGHOUT THE WORLD WILL RESULT IN DIFFERENT SEQUENCES AND TIME INTERVALS TO ACCOMPLISH THE TASKS SHOWN.

BECAUSE OF THIS, GROUND OPERATIONS REQUIREMENTS SHOULD BE COORDINATED WITH THE USING AIRLINES PRIOR TO RAMP PLANNING.

---

5.2 TERMINAL OPERATIONS TURNAROUND STATION
MODEL DC-9-32

REV F 5/84

97
### ESTIMATED TIME (MINUTES)

<table>
<thead>
<tr>
<th>Task</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGINE SHUTDOWN</td>
<td>1.0</td>
</tr>
<tr>
<td>UNLOAD BAGGAGE/CARGO&lt;sup&gt;1&lt;/sup&gt;</td>
<td>8.5</td>
</tr>
<tr>
<td>DEPLANe PASSENGERS&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td>4.8</td>
</tr>
<tr>
<td>SERVICE WASTE TANKS</td>
<td>3.0</td>
</tr>
<tr>
<td>SERVICE POTABLE WATER</td>
<td>5.0</td>
</tr>
<tr>
<td>SERVICE GALLEYS</td>
<td>11.5</td>
</tr>
<tr>
<td>SERVICE AIRPLANE INTERIOR</td>
<td>10.9</td>
</tr>
<tr>
<td>FUEL AIRPLANE&lt;sup&gt;4&lt;/sup&gt; (≈1,300 N MI)</td>
<td>7.0</td>
</tr>
<tr>
<td>LOAD CARGO/BAGGAGE&lt;sup&gt;1&lt;/sup&gt;</td>
<td>10.2</td>
</tr>
<tr>
<td>LOAD PASSENGERS&lt;sup&gt;2,3&lt;/sup&gt;</td>
<td>5.6</td>
</tr>
<tr>
<td>MONITOR ENGINE START</td>
<td>2.0</td>
</tr>
<tr>
<td>CLEAR AIRPLANE FOR DEPARTURE</td>
<td>1.4</td>
</tr>
</tbody>
</table>

#### Critical time path
- Vehicle movement
- Tourist class configuration with 125 passengers
- 100-percent load factor
- Two baggage/cargo crews

---

<sup>1</sup> Time available for 1,060 lb of bulk cargo

<sup>2</sup> Passenger enplane and deplane via front airstair and ventral stairs

<sup>3</sup> An additional 2.9 minutes required for bridge operations

<sup>4</sup> Additional time required for fueling if auxiliary tanks or PSIG system pressure are used.

---

**NOTE:** ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

This data is provided to illustrate the general scope and types of tasks involved in terminal operations. Varying airline practices and operating circumstances throughout the world will result in different sequences and time intervals to accomplish the tasks shown.

Because of this, ground operations requirements should be coordinated with the using airlines prior to ramp planning.

---

### 5.2 TERMINAL OPERATIONS TURNAROUND STATION

**MODEL DC-9-41**

---

98

REV F 5/84
<table>
<thead>
<tr>
<th>Task</th>
<th>Time (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Shutdown</td>
<td>1.0</td>
</tr>
<tr>
<td>Unload Baggage/Cargo¹</td>
<td>9.4</td>
</tr>
<tr>
<td>Deplane Passengers²,³</td>
<td>5.2</td>
</tr>
<tr>
<td>Service Waste Tanks</td>
<td>7.3</td>
</tr>
<tr>
<td>Service Potable Water</td>
<td>5.0</td>
</tr>
<tr>
<td>Service Galley</td>
<td>12.5</td>
</tr>
<tr>
<td>Service Airplane Interior</td>
<td>11.7</td>
</tr>
<tr>
<td>Fuel Airplane ⁴ (≈1,300 N MI)</td>
<td>7.0</td>
</tr>
<tr>
<td>Load Cargo/Baggage¹</td>
<td>11.2</td>
</tr>
<tr>
<td>Load Passengers²,³</td>
<td>6.1</td>
</tr>
<tr>
<td>Monitor Engine Start</td>
<td>2.0</td>
</tr>
<tr>
<td>Clear Airplane For Departure</td>
<td>1.4</td>
</tr>
</tbody>
</table>

¹Time available for 1,140 lb of bulk cargo
²Passenger enplane and deplane via front airstair and ventral stairs
³An additional 3.1 minutes required for bridge operations
⁴Additional time required for fueling if auxiliary tanks or 35 PSIG system pressure are used.

Critical time path
Vehicle movement

- Tourist class configuration with 135 passengers
- 100-percent load factor
- Two baggage/cargo crews

NOTE: ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

This data is provided to illustrate the general scope and types of tasks involved in terminal operations. Varying airline practices and operating circumstances throughout the world will result in different sequences and time intervals to accomplish the tasks shown.

Because of this, ground operations requirements should be coordinated with the using airlines prior to ramp planning.

5.2 Terminal Operations Turnaround Station
Model DC-9-51
ENGINE SHUTDOWN 1.0
DEPLANE PASSENGERS$^2,4$ 1.9
UNLOAD BAGGAGE/CARGO$^1$ 3.1
SERVICE WASTE TANKS 3.0
SERVICE POTABLE WATER 5.0
SERVICE AIRPLANE INTERIOR$^3$ 5.0
LOAD BAGGAGE/CARGO$^1$ 3.7
ENPLANE PASSENGERS$^2,4$ 2.3
MONITOR ENGINE START 2.0
CLEAR AIRPLANE FOR DEPARTURE 1.4

- Critical time path
- Vehicle movement
- 55 percent exchange of passengers
- Tourist class configuration with 50 passengers
- Two baggage/cargo crews

$^1$Time available for 440 lb of bulk cargo
$^2$Passenger enplane and deplane via front airstair and ventral stairs
$^3$Cabin tidied by cabin attendant
$^4$An additional 1.1 minutes required for bridge operations

NOTE: ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

THIS DATA IS PROVIDED TO ILLUSTRATE THE GENERAL SCOPE AND TYPES OF TASKS INVOLVED IN TERMINAL OPERATIONS. VARYING AIRLINE PRACTICES AND OPERATING CIRCUMSTANCES THROUGHOUT THE WORLD WILL RESULT IN DIFFERENT SEQUENCES AND TIME INTERVALS TO ACCOMPLISH THE TASKS SHOWN.

BECAUSE OF THIS, GROUND OPERATIONS REQUIREMENTS SHOULD BE COORDINATED WITH THE USING AIRLINES PRIOR TO RAMP PLANNING.

5.3 TERMINAL OPERATIONS, EN ROUTE STATION
MODEL DC-9-15 AND -21
<table>
<thead>
<tr>
<th>Task</th>
<th>Time (Minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Shutdown</td>
<td>1.0</td>
</tr>
<tr>
<td>Deplane Passengers(^2,^4)</td>
<td>1.9</td>
</tr>
<tr>
<td>Unload Baggage/Cargo(^1)</td>
<td>3.4</td>
</tr>
<tr>
<td>Service Waste Tanks</td>
<td>3.0</td>
</tr>
<tr>
<td>Service Potable Water</td>
<td>5.0</td>
</tr>
<tr>
<td>Service Airplane Interior(^3)</td>
<td>5.0</td>
</tr>
<tr>
<td>Load Baggage/Cargo(^1)</td>
<td>4.4</td>
</tr>
<tr>
<td>Enplane Passengers(^2,^4)</td>
<td>2.8</td>
</tr>
<tr>
<td>Monitor Engine Start</td>
<td>2.0</td>
</tr>
<tr>
<td>Clear Airplane for Departure</td>
<td>1.4</td>
</tr>
</tbody>
</table>

---

- **Critical time path**
- **Vehicle movement**

- 55 percent exchange of passengers
- Tourist class configuration with 63 passengers
- Two baggage/cargo crews

1. Time available for 460 lb of bulk cargo
2. Passenger enplane and deplane via front airstair and ventral stairs
3. Cabin tidied by cabin attendant
4. An additional 1.5 minutes required for bridge operations

---

**NOTE:**
ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

THIS DATA IS PROVIDED TO ILLUSTRATE THE GENERAL SCOPE AND TYPES OF TASKS INVOLVED IN TERMINAL OPERATIONS. VARYING AIRLINE PRACTICES AND OPERATING CIRCUMSTANCES THROUGHOUT THE WORLD WILL RESULT IN DIFFERENT SEQUENCES AND TIME INTERVALS TO ACCOMPLISH THE TASKS SHOWN.

BECAUSE OF THIS, GROUND OPERATIONS REQUIREMENTS SHOULD BE COORDINATED WITH THE USING AIRLINES PRIOR TO RAMP PLANNING.

---

**5.3 TERMINAL OPERATIONS, EN ROUTE STATION**
**MODEL DC-9-32**

**REV F 5/84**

101
## 5.3 Terminal Operations, En Route Station

**Model DC-9-41**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Shutdown</td>
<td>1.0</td>
</tr>
<tr>
<td>Deplane Passengers</td>
<td>2.7</td>
</tr>
<tr>
<td>Unload Baggage/Cargo</td>
<td>3.7</td>
</tr>
<tr>
<td>Service Waste Tanks</td>
<td>3.0</td>
</tr>
<tr>
<td>Service Potable Water</td>
<td>5.0</td>
</tr>
<tr>
<td>Service Airplane Interior</td>
<td>5.0</td>
</tr>
<tr>
<td>Load Baggage/Cargo</td>
<td>4.7</td>
</tr>
<tr>
<td>Enplane Passengers</td>
<td>3.1</td>
</tr>
<tr>
<td>Monitor Engine Start</td>
<td>2.0</td>
</tr>
<tr>
<td>Clear Airplane for Departure</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**Critical time path**

**Vehicle movement**

- 55 percent exchange of passengers
- Tourist class configuration with 69 passengers
- Two baggage/cargo crews

---

1. Time available for 520 lb of bulk cargo
2. Passenger enplane and deplane via front airstair and ventral stairs
3. Cabin tidied by cabin attendants
4. An additional 1.6 minutes required for bridge operations

**NOTE:** ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

This data is provided to illustrate the general scope and types of tasks involved in terminal operations. Varying airline practices and operating circumstances throughout the world will result in different sequences and time intervals to accomplish the tasks shown.

Because of this, ground operations requirements should be coordinated with the using airlines prior to ramp planning.
<table>
<thead>
<tr>
<th>Task</th>
<th>Time (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine Shutdown</td>
<td>1.0</td>
</tr>
<tr>
<td>Deplane Passengers$^2,4$</td>
<td>2.9</td>
</tr>
<tr>
<td>Unload Baggage/Cargo$^1$</td>
<td>4.1</td>
</tr>
<tr>
<td>Service Waste Tanks</td>
<td>3.0</td>
</tr>
<tr>
<td>Service Potable Water</td>
<td>5.0</td>
</tr>
<tr>
<td>Service Airplane Interior$^3$</td>
<td>5.0</td>
</tr>
<tr>
<td>Load Baggage/Cargo$^1$</td>
<td>4.8</td>
</tr>
<tr>
<td>Enplane Passengers$^2,4$</td>
<td>3.4</td>
</tr>
<tr>
<td>Monitor Engine Start</td>
<td>2.0</td>
</tr>
<tr>
<td>Clear Airplane for Departure</td>
<td>1.4</td>
</tr>
</tbody>
</table>

**Critical time path**

**Vehicle movement**

- 55 percent exchange of passengers
- Tourist class configuration with 76 passengers
- Two baggage/cargo crews

$^1$ Time available for 530 lb of bulk cargo

$^2$ Passenger enplane and deplane via front airstair and ventral stairs

$^3$ Cabin tied by cabin attendant

$^4$ An additional 1.8 minutes required for bridge operations

**NOTE:** ONBOARD APU OPERATIONAL FOR AIR CONDITIONING, ENGINE START, AND ELECTRICAL POWER.

This data is provided to illustrate the general scope and types of tasks involved in terminal operations. Varying airline practices and operating circumstances throughout the world will result in different sequences and time intervals to accomplish the tasks shown.

Because of this, ground operations requirements should be coordinated with the using airlines prior to ramp planning.

**5.3 TERMINAL OPERATIONS, EN ROUTE STATION**

**MODEL DC-9-51**
5.4 GROUND SERVICE CONNECTIONS
MODEL DC-9-15
5.4 GROUND SERVICE CONNECTIONS
MODEL DC-9-21
5.4 GROUND SERVICE CONNECTIONS
MODEL DC-9-32

*(ACCESS THROUGH WHEEL WELLS)
5.4 GROUND SERVICE CONNECTIONS
MODEL DC-9-41

*(ACCESS THRU WHEEL WELLS)*
5.4 GROUND SERVICE CONNECTIONS
MODEL DC-9-51

*(ACCESS THRU WHEEL WELLS)*
<table>
<thead>
<tr>
<th>5.4.1 HYDRAULIC SYSTEM</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT-IN.</td>
<td>Meters</td>
<td>FTP-IN.</td>
</tr>
<tr>
<td>2 SERVICE CONNECTIONS</td>
<td></td>
<td></td>
<td>3-2</td>
</tr>
<tr>
<td>HYDRAULIC GROUND connections</td>
<td>45-6</td>
<td>13.9</td>
<td>0-4</td>
</tr>
<tr>
<td>8 ACCUMULATORS</td>
<td></td>
<td></td>
<td>1-7</td>
</tr>
<tr>
<td>2 BRAKE ACCUMULATORS LH AND RH</td>
<td>51-10</td>
<td>15.8</td>
<td>1-0</td>
</tr>
<tr>
<td>2 SYSTEM ACCUMULATORS LH AND RH</td>
<td>52-4</td>
<td>16.0</td>
<td>1-6</td>
</tr>
<tr>
<td>2 THRUST REVERSER ACCUMULATORS LH AND RH</td>
<td>69-2</td>
<td>21.1</td>
<td>4-0</td>
</tr>
<tr>
<td>D. 2 ELEVATOR ACCUMULATORS RH ONLY (SYSTEM PRESSURE 3000 PSI SKYDROL 500B)</td>
<td>77-11</td>
<td>23.7</td>
<td>2-0</td>
</tr>
</tbody>
</table>

| 5.4.2 ELECTRICAL SYSTEM |              |        | 4-4     | 1.3     | 5-0     | 1.5     |
| 1 GROUND SERVICE CONNECTION |        |        | –       | –       | –       | –       |
| 120/208 VOLTS, 400 HZ, 3 PHASE, 4 WIRE 60 KVA CONT. AT 0.80 P.F. | 7-8    | 2.3    | 4-4     | 1.3     | 5-0     | 1.5     |

| 5.4.3 OXYGEN SYSTEM |              |        | 4-4     | 1.3     | 5-0     | 1.5     |
| NO GROUND SERVICE CONNECTION |          |        | –       | –       | –       | –       |
| A. AIR CREW SYSTEM, ONE 48 CU FT CYLINDER | O₂ CYLINDERS EXCHANGED. LOCATED IN AIR CREW COMPARTMENT |
| B. PASSENGER SYSTEM, ONE 114 CU FT CYLINDER | |

| 5.4.4 FUEL SYSTEM |              |        | 4-4     | 1.3     | 5-0     | 1.5     |
| 1 GROUND SERVICE POINT |        |        | –       | –       | –       | –       |
| 375 GPM (1419 LPM) AT 50 PSIG (RH WING) | 48-7   | 14.8   | 21-4    | 6.5     | –       | –       | 5-7     | 1.7     |
| 3 FUEL TANKS | | | |
| TOTAL CAPACITY 3690 U.S. GAL. (13,967 LITERS) | |
| 2 OUTBOARD MAIN TANKS – 1388 GAL. EACH (5254 LITERS) | | | |

GROUND SERVICE CONNECTION DATA
MODEL DC-9-15 AND -21
<table>
<thead>
<tr>
<th>5.4.4</th>
<th>FUEL SYSTEM (CONT)</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 CENTER WING TANK – 914 GAL (3459 LITERS)</td>
<td>FT-IN.</td>
<td>METERS</td>
<td>RIGHT SIDE</td>
</tr>
<tr>
<td></td>
<td>• 2 GRAVITY FEED FILLER INLETS</td>
<td>53-3</td>
<td>16.2</td>
<td>39-4</td>
</tr>
<tr>
<td></td>
<td>• 4 SUMP DRAIN VALVES, 2 LH AND 2 RH</td>
<td>43-4</td>
<td>13.2</td>
<td>4-10</td>
</tr>
<tr>
<td></td>
<td>A. CENTER WING TANK</td>
<td>47-2</td>
<td>14.4</td>
<td>5-9</td>
</tr>
<tr>
<td></td>
<td>B. WING TANKS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 5.4.5 | PNEUMATIC SYSTEM | 72-4 | 22.0 | | 72-8 | 22.1 | 2-1 | 0.6 | 4-0 | 1.2 |
|       | • 1 SERVICE CONNECTION FOR AIR CONDITIONING (SEE SECTION 5.6) AND ENGINE STARTING (SEE SECTION 5.5) | |
|       | • 1 SERVICE CONNECTION FOR PRECONDITIONED AIR (SEE SECTION 5.7) | |

| 5.4.6 | POTABLE WATER SYSTEM | 11-4 | 3.5 | 4-5 | 1.3 | | 5-4 | 1.6 |
|       | • 1 SERVICE CONNECTION AT 10 PSIG PRESSURE | A. PASSENGER FORWARD POTABLE WATER SERVICE 30 U.S. GALLONS (114 LITERS) AT 6 GALLONS (23 LITERS) PER MINUTE | |

| 5.4.7 | LAVATORY SYSTEM | 65-7 | 20.0 | | 4-4 | 1.3 | 6-0 | 1.8 |
|       | • 1 SERVICE CONNECTION 34 U.S. GALLONS (129 LITERS) PLUS 16 U.S. GALLONS (61 LITERS) FLUSH | |

GROUND SERVICE CONNECTION DATA
MODEL DC-9-15 AND -21
<table>
<thead>
<tr>
<th>5.4.8 ENGINE SERVICE SYSTEM</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 SERVICE POINTS</td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>A. OIL GRAVITY FILL-CAN SYSTEM OF 5.5 U.S. GAL. (21 LITERS), OIL TYPE SPECIFIED BY P&amp;W SERVICE BULLETIN NO. 238</td>
<td>65-9</td>
<td>20.0</td>
<td>7.8</td>
</tr>
<tr>
<td>B. CONSTANT SPEED DRIVE GRAVITY FEED – CAN, REFER TO DC-9 STANDARD PRACTICE MAINTENANCE MANUAL</td>
<td>70-0</td>
<td>21.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-15 AND -21
<table>
<thead>
<tr>
<th>5.4.1 HYDRAULIC SYSTEM</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• 2 SERVICE CONNECTIONS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. HYDRAULIC GROUND CONNECTIONS</td>
<td>54-6</td>
<td>16.6</td>
<td>3-2</td>
<td>1.0</td>
</tr>
<tr>
<td>• 10 ACCUMULATORS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 4 BRAKE ACCUMULATORS</td>
<td>61-4</td>
<td>18.7</td>
<td>0-3</td>
<td>0.1</td>
</tr>
<tr>
<td>2 LH AND 2 RH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. 2 SYSTEM ACCUMULATORS LH AND RH</td>
<td>61-10</td>
<td>18.8</td>
<td>1-6</td>
<td>0.5</td>
</tr>
<tr>
<td>C. 2 THRUST REVERSER ACCUMULATORS LH AND RH</td>
<td>84-1</td>
<td>25.6</td>
<td>4-0</td>
<td>1.2</td>
</tr>
<tr>
<td>D. 2 ELEVATOR ACCUMULATORS RH ONLY (SYSTEM PRESSURE 3000 PSI SKYDROL 500B)</td>
<td>92-10</td>
<td>28.3</td>
<td>2-0</td>
<td>0.6</td>
</tr>
<tr>
<td>5.4.2 ELECTRICAL SYSTEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GROUND SERVICE CONNECTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 120/208 VOLTS, 400 HZ 3 PHASE, 4 WIRE 60 KVA CONT AT 0.80 P.F.</td>
<td>7-8</td>
<td>2.3</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>5.4.3 OXYGEN SYSTEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO GROUND SERVICE CONNECTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>O₂ CYLINDERS EXCHANGED. LOCATED IN AIR CREW COMPARTMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. AIR CREW SYSTEM, ONE 48 CU FT CYLINDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. PASSENGER SYSTEM, ONE 114 CU FT CYLINDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4.4 FUEL SYSTEM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 GROUND SERVICE POINT</td>
<td>58-3</td>
<td>17.8</td>
<td>21-4</td>
<td>6.5</td>
</tr>
<tr>
<td>• 375 GPM (1419 LITERS PER MINUTE) AT 50 PSIG (RH WING)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 FUEL TANKS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• TOTAL CAPACITY 3690 U.S. GAL (13,967 LITERS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-32
<table>
<thead>
<tr>
<th>5.4.4 FUEL SYSTEM (CONT)</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>2 OUTBOARD MAIN TANKS —</td>
<td>62-8</td>
<td>19.1</td>
<td>39-4</td>
</tr>
<tr>
<td>1388 GAL EACH (5254 LITERS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 CENTERWING TANK — 914 GAL (3459 LITERS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 GRAVITY FEED FILLER INLETS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 SUMP DRAIN VALVES, 2 LH AND 2 RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. CENTER WING TANK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52-10</td>
<td>16.1</td>
<td>4-10</td>
<td>1.5</td>
</tr>
<tr>
<td>B. WING TANKS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56-8</td>
<td>17.3</td>
<td>5-9</td>
<td>1.8</td>
</tr>
<tr>
<td>5.4.5 PNEUMATIC SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 SERVICE CONNECTION FOR AIR CONDITIONING (SEE SECTION 5.6) AND ENGINE STARTING (SEE SECTION 5.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>87-3</td>
<td>26.6</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>5.4.6 POTABLE WATER SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 SERVICE CONNECTION AT 10 PSIG PRESSURE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. PASSENGER FORWARD POTABLE WATER SERVICE 30 U.S. GALLONS (114 LITERS) AT 6 GALLONS (23 LITERS) PER MINUTE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-4</td>
<td>3.5</td>
<td>4-5</td>
<td>1.3</td>
</tr>
<tr>
<td>5.4.7 LAVATORY SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 SERVICE CONNECTION 34 U.S. GALLONS (129 LITERS) PLUS 16 U.S. GALLONS (61 LITERS) FLUSH REQUIRED AT 25-75 PSIG AND 30 GALLONS (114 LITERS) PER MINUTE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>75-0</td>
<td>22.9</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-32
<table>
<thead>
<tr>
<th>5.4.8 ENGINE SERVICE SYSTEM</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>2 SERVICE POINTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. OIL GRAVITY FILL-CAN SYSTEM OF 5.5 U.S. GAL. (21 LITERS), OIL TYPE SPECIFIED BY P&amp;W SERVICE BULLETIN NO. 238</td>
<td>75-2</td>
<td>22.9</td>
<td>7-8</td>
</tr>
<tr>
<td>B. CONSTANT SPEED DRIVE GRAVITY FEED — CAN, REFER TO DC-9 STANDARD PRACTICE MAINTENANCE MANUAL</td>
<td>79-5</td>
<td>24.2</td>
<td>8-3</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
<td>Distance Aft of Nose (FT-IN, Meters)</td>
<td>Distance from Airplane Centerline (FT-IN, Meters)</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>-------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>5.4.1</td>
<td>HYDRAULIC SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 SERVICE CONNECTIONS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. HYDRAULIC GROUND CONNECTIONS</td>
<td>57-7 17.6</td>
<td>3-2 1.0</td>
</tr>
<tr>
<td></td>
<td>10 ACCUMULATORS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. 4 BRAKE ACCUMULATORS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 LH AND 2 RH</td>
<td>64-6 19.7</td>
<td>0-4 0.1</td>
</tr>
<tr>
<td></td>
<td>B. 2 SYSTEM ACCUMULATORS LH AND RH</td>
<td>65-1 19.8</td>
<td>1-6 0.5</td>
</tr>
<tr>
<td></td>
<td>C. 2 THRUST REVERSER ACCUMULATORS LH AND RH</td>
<td>92-0 28.0</td>
<td>4-0 1.2</td>
</tr>
<tr>
<td></td>
<td>D. 2 ELEVATOR ACCUMULATORS RH ONLY (SYSTEM PRESSURE 3000 PSI SKYDROL 5008)</td>
<td>100-9 30.7</td>
<td>2-0 0.6</td>
</tr>
<tr>
<td>5.4.2</td>
<td>ELECTRICAL SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 GROUND SERVICE CONNECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>120/208 VOLTS, 400 HZ, 3 PHASE, 4 WIRE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60 KVA CONT AT 0.80 P.F.</td>
<td>7-8 2.3</td>
<td>– –</td>
</tr>
<tr>
<td>5.4.3</td>
<td>OXYGEN SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NO GROUND SERVICE CONNECTION</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. AIR CREW SYSTEM, ONE 48 CU FT CYLINDER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. PASSENGER SYSTEM, ONE 114 CU FT CYLINDER</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O₂ CYLINDERS EXCHANGED. LOCATED IN AIR CREW COMPARTMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4.4</td>
<td>FUEL SYSTEM</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 GROUND SERVICE POINT</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>375 GPM (1419 LITERS PER MINUTE) AT 50 PSIG (RH WING)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 FUEL TANKS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL CAPACITY 3690 U.S. GAL (13,967 LITERS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 OUTBOARD MAIN TANKS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1388 GAL EACH (5254 LITERS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-41
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Distance Aft of Nose</th>
<th>Distance from Airplane Centerline</th>
<th>Height from Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>5.4.4</td>
<td>FUEL SYSTEM (CONT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 CENTER WING TANK – 914 GALLONS (3459 LITERS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 2 GRAVITY FEED FILLER INLETS</td>
<td>65.9</td>
<td>20.0</td>
<td>39.4</td>
</tr>
<tr>
<td></td>
<td>• 4 SUMP DRAIN VALVES, 2 LH AND 2 RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. CENTER WING TANK</td>
<td>56.0</td>
<td>17.1</td>
<td>4.10</td>
</tr>
<tr>
<td></td>
<td>B. WING TANKS</td>
<td>59.10</td>
<td>18.2</td>
<td>5.9</td>
</tr>
<tr>
<td>5.4.5</td>
<td>PNEUMATIC SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 SERVICE CONNECTION FOR AIR CONDITIONING (SEE SECTION 5.6) AND ENGINE STARTING (SEE SECTION 5.5)</td>
<td>93.7</td>
<td>28.5</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>• 1 SERVICE CONNECTION FOR PRECONDITIONED AIR (SEE SECTION 5.7)</td>
<td>93.11</td>
<td>28.6</td>
<td>2.1</td>
</tr>
<tr>
<td>5.4.6</td>
<td>POTABLE WATER SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 SERVICE CONNECTION AT 10 PSIG PRESSURE</td>
<td>11.4</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>A. PASSENGER FORWARD POTABLE WATER SERVICE 30 U.S. GALLONS (114 LITERS) AT 6 GALLONS (23 LITERS) PER MINUTE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4.7</td>
<td>LAVATORY SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• 1 SERVICE CONNECTION 34 U.S. GALLONS (129 LITERS) PLUS 16 U.S. GALLONS (61 LITERS) FLUSH REQUIRED AT 25-75 PSIG AND 30 GALLONS (114 LITERS) PER MINUTE</td>
<td>77.5</td>
<td>23.6</td>
<td>–</td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-41
<table>
<thead>
<tr>
<th>5.4.8 ENGINE SERVICE SYSTEM</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 SERVICE POINTS</td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>A. OIL GRAVITY FILL-CAN SYSTEM OF 55 U.S. GAL (21 LITERS), OIL TYPE SPECIFIED BY P&amp;W SERVICE BULLETIN NO. 238</td>
<td>77.7</td>
<td>23.6</td>
<td>7.8</td>
</tr>
<tr>
<td>B. CONSTANT SPEED DRIVE GRAVITY FEED CAN, REFER TO DC-9 STANDARD PRACTICE MAINTENANCE MANUAL</td>
<td>81.9</td>
<td>24.9</td>
<td>8.3</td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-41
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Distance Aft of Nose</th>
<th>Distance from Airplane Centerline</th>
<th>Height from Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.4.1</td>
<td>Hydraulic System</td>
<td>FT-IN.</td>
<td>Meters</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>5.4.2</td>
<td>Electrical System</td>
<td>FT-IN.</td>
<td>Meters</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>5.4.3</td>
<td>Oxygen System</td>
<td>FT-IN.</td>
<td>Meters</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>5.4.4</td>
<td>Fuel System</td>
<td>FT-IN.</td>
<td>Meters</td>
<td>FT-IN.</td>
</tr>
</tbody>
</table>

**Ground Service Connection Data**

**Model DC-9-51**
<table>
<thead>
<tr>
<th>5.4.4 FUEL SYSTEM (CONT)</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>1 CENTER WING TANK – 914 GAL (3459 LITERS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2 GRAVITY FEED FILLER INLETS</td>
<td>70.5</td>
<td>21.5</td>
<td>39.4</td>
</tr>
<tr>
<td>• 4 SUMP DRAIN VALVES, 2 LH AND 2 RH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. CENTER WING TANK</td>
<td>60.9</td>
<td>18.5</td>
<td>4-10</td>
</tr>
<tr>
<td>B. WING TANKS</td>
<td>64.7</td>
<td>19.7</td>
<td>5-9</td>
</tr>
<tr>
<td>5.4.5 PNEUMATIC SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 SERVICE CONNECTION FOR AIR CONDITIONING (SEE SECTION 5.6) AND ENGINE STARTING (SEE SECTION 5.5)</td>
<td>101-6</td>
<td>30.9</td>
<td>–</td>
</tr>
<tr>
<td>• 1 SERVICE CONNECTION FOR PRECONDITIONED AIR (SEE SECTION 5.7)</td>
<td>101-10</td>
<td>31.0</td>
<td>2.1</td>
</tr>
<tr>
<td>5.4.6 POTABLE WATER SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 SERVICE CONNECTION AT 10 PSIG PRESSURE</td>
<td>11.4</td>
<td>3.5</td>
<td>4.5</td>
</tr>
<tr>
<td>A. PASSENGER FORWARD POTABLE WATER SERVICE 30 U.S. GALLONS (114 LITERS) AT 6 GALLONS (23 LITERS) PER MINUTE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.4.7 LAVATORY SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 1 SERVICE CONNECTION</td>
<td>85.4</td>
<td>26.0</td>
<td>–</td>
</tr>
<tr>
<td>34 U.S. GALLONS (129 LITERS) PLUS 16 U.S. GALLONS (61 LITERS) FLUSH REQUIRED AT 25-75 PSIG AND 30 GALLONS (114 LITERS) PER MINUTE</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-51
<table>
<thead>
<tr>
<th>5.4.8 ENGINE SERVICE SYSTEM</th>
<th>DISTANCE AFT OF NOSE</th>
<th>DISTANCE FROM AIRPLANE CENTERLINE</th>
<th>HEIGHT FROM GROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 SERVICE POINTS</td>
<td>FT-IN.</td>
<td>METERS</td>
<td>FT-IN.</td>
</tr>
<tr>
<td>A. OIL GRAVITY FILL-CAN SYSTEM OF 5.5 U.S. GAL (21 LITERS), OIL TYPE SPECIFIED BY P&amp;W SERVICE BULLETIN NO. 238</td>
<td>85-6</td>
<td>26.1</td>
<td>7.8</td>
</tr>
<tr>
<td>B. CONSTANT SPEED DRIVE GRAVITY FEED-CAN, REFER TO DC-9 STANDARD PRACTICE MAINTENANCE MANUAL</td>
<td>89-8</td>
<td>27.3</td>
<td>8.3</td>
</tr>
</tbody>
</table>

GROUND SERVICE CONNECTION DATA
MODEL DC-9-51
5.5 ENGINE STARTING PNEUMATIC REQUIREMENTS
MODEL DC-9
INITIAL CABIN TEMP AT 0°F (-17.8°C). OUTSIDE AIR TEMP AT 0°F (-17.8°C). NO GALLEY LOAD, DULL DAY, NO LIGHTS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT GROUND CONNECTION = 300°F (148.9°C)

![Graph showing cabin airflow (W) vs. time to heat cabin to 70°F (21.1°C) (minutes).]

TWO SYSTEMS
W = 22√P + 13

NOTE:
FOR PRESSURES ABOVE 23 PSIG
USE 23 PSIG IN FLOW EQUATIONS

ONE SYSTEM
W = 11√P + 14

INITIAL CABIN TEMP AT 103°F (39.4°C). OUTSIDE AIR TEMP AT 103°F (39.4°C); SOLAR LOAD x 1200 BTU/HR. BRIGHT DAY; SOLAR IRRADIATION; NO GALLEY LOAD; DAY LIGHTING ON; NO PASSENGERS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT THE GROUND CONNECTION IS 410°F (210°C)

![Graph showing cabin airflow (W) vs. time to cool cabin to 80°F (26.7°C) (minutes).]

TWO SYSTEMS
W = 22√P

45% RELATIVE HUMIDITY

20% RELATIVE HUMIDITY

NOTE:
FOR PRESSURES ABOVE 23 PSIG
USE 23 PSIG IN FLOW EQUATIONS

CAUTION: ELECTRICAL POWER IS REQUIRED WHENEVER THE AIR-CONDITIONING SYSTEM IS OPERATED

5.6 GROUND PNEUMATIC POWER REQUIREMENTS
MODELS DC-9-15 AND -21
INITIAL CABIN TEMP AT 0°F (−17.8°C). OUTSIDE AIR TEMP AT 0°F (−17.8°C). NO GALLEY LOAD, DULL DAY, NO LIGHTS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT GROUND CONNECTION = 300°F (148.9°C)

HEATING

TWO SYSTEMS

\[ W = 28\sqrt{P} + 13 \]

NOTE:
FOR PRESSURES ABOVE 28 PSIG
USE 28 PSIG IN FLOW EQUATIONS

ONE SYSTEM

\[ W = 14\sqrt{P} + 14 \]

TIME TO HEAT CABIN TO 70°F (21.1°C) (MINUTES)

INITIAL CABIN TEMP AT 103°F (39.4°C). OUTSIDE AIR TEMP AT 103°F (39.4°C). SOLAR LOAD x 1600 BTU/HR. BRIGHT DAY; SOLAR IRRADIATION; NO GALLEY LOAD; DAY LIGHTING ON; NO PASSENGERS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT THE GROUND CONNECTOR IS 410°F (210°C)

COOLING

45% RELATIVE HUMIDITY

\[ W = 12P^{3/4} \]

NOTE:
FOR PRESSURES ABOVE 28 PSIG
USE 28 PSIG IN FLOW EQUATIONS

20% RELATIVE HUMIDITY

TIME TO COOL CABIN TO 80°F (26.7°C) (MINUTES)

CAUTION: ELECTRICAL POWER IS REQUIRED WHENEVER THE AIR CONDITIONING SYSTEM IS OPERATED.

5.6 GROUND PNEUMATIC POWER REQUIREMENTS
MODEL DC-9-32
INITIAL CABIN TEMP AT 0°F (−17.8°C). OUTSIDE AIR TEMP AT 0°F (−17.8°C). NO GALLEY LOAD, DULL DAY, NO LIGHTS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT GROUND CONNECTION = 300°F (148.9°C)

TIME TO HEAT CABIN TO 70°F (21.1°C) (MINUTES)

TWO SYSTEMS
W = 28√P + 13
ONE SYSTEM
W = 14√P + 14

NOTE:
FOR PRESSURES ABOVE 28 PSIG
USE 28 PSIG IN FLOW EQUATIONS

INITIAL CABIN TEMP AT 103°F (39.4°C). OUTSIDE AIR TEMP AT 103°F (39.4°C). SOLAR LOAD x 1655 BTU/HR. BRIGHT DAY; SOLAR IRRADIATION; NO GALLEY LOAD; DAY LIGHTING ON; NO PASSENGERS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT THE GROUND CONNECTION IS 410°F (210°C)

TIME TO COOL CABIN TO 80°F (26.7°C) (MINUTES)

45% RELATIVE HUMIDITY

NOTE:
FOR PRESSURES ABOVE 28 PSIG
USE 28 PSIG IN FLOW EQUATIONS

TWO SYSTEMS
W = 12 P^{3/4}

20% RELATIVE HUMIDITY

CAUTION: ELECTRICAL POWER IS REQUIRED WHenever THE AIR CONDITIONING SYSTEM IS OPERATED.

5.6 GROUND PNEUMATIC POWER REQUIREMENTS
MODEL DC-9-41
INITIAL CABIN TEMP AT 0°F (−17.8°C). OUTSIDE AIR TEMP AT 0°F (−17.8°C). NO GALLEY LOAD, DULL DAY, NO LIGHTS. P = 12 TO 70 PSIG AT THE GROUND CONNECTION. TEMP AT GROUND CONNECTION = 300°F (148.9°C)

**HEATING**

- TWO SYSTEMS
  \[ W = 22\sqrt{P} + 13 \]
- ONE SYSTEM
  \[ W = 11\sqrt{P} + 14 \]

NOTE: FOR PRESSURES ABOVE 28 PSIG USE 28 PSIG IN FLOW EQUATIONS

**COOLING**

- 45% RELATIVE HUMIDITY
- 20% RELATIVE HUMIDITY

\[ W = 12P^{3/4} \]

NOTE: FOR PRESSURES ABOVE 28 PSIG USE 28 PSIG IN FLOW EQUATIONS

TIME TO HEAT CABIN TO 70°F (21.1°C) (MINUTES)

TIME TO COOL CABIN TO 80°F (26.7°C) (MINUTES)

CAUTION: ELECTRICAL POWER IS REQUIRED WHenever THE AIR-CONDITIONING SYSTEM IS OPERATED.

5.6 GROUND PNEUMATIC POWER REQUIREMENTS

MODEL DC-9-51
5.7 PRECONDITIONED AIRFLOW REQUIREMENTS
MODEL DC-9-32
1. CABIN TEMP AT 75°F (24°C). 5 CREW, 117 PASSENGERS. NO GALLEY LOAD. BRIGHT DAY; SOLAR IRRADIATION, SOLAR LOAD x 1655 BTU/HR. DAY ELECTRICAL LOAD x 2380 BTU/HR.

2. CABIN TEMP AT 80°F (26.7°C). 5 CREW, 117 PASSENGERS. NO GALLEY LOAD. BRIGHT DAY; SOLAR IRRADIATION, SOLAR LOAD x 1655 BTU/HR. DAY ELECTRICAL LOAD x 2380 BTU/HR.

3. CABIN TEMP AT 75°F (24°C). 3 CREW MEMBERS ONLY. BRIGHT DAY; SOLAR IRRADIATION, SOLAR LOAD x 1655 BTU/HR. ELECTRICAL LOAD x 2380 BTU/HR. GALLEY LOAD x 3000 BTU/HR.

4. AND 6. CABIN TEMP AT 70°F (21.1°C). NO CREW, NO PASSENGERS. DULL DAY OR NIGHT; NO SOLAR IRRADIATION. NO ELECTRICAL LOAD, NO GALLEY LOAD.

5.7 PRECONDITIONED AIRFLOW REQUIREMENTS
MODEL DC-9-41
1. CABIN TEMP AT 75°F (24°C). 5 CREW, 143 PASSENGERS. NO GALLEY LOAD. BRIGHT DAY; SOLAR IRRADIATION, SOLAR LOAD x 2060 BTU/HR. DAY ELECTRICAL LOAD x 4080 BTU/HR.

2. CABIN TEMP AT 80°F (26.7°C). 5 CREW, 143 PASSENGERS. NO GALLEY LOAD. BRIGHT DAY; SOLAR IRRADIATION, SOLAR LOAD x 2060 BTU/HR. DAY ELECTRICAL LOAD x 4080 BTU/HR.

3. CABIN TEMP AT 75°F (24°C). 3 CREW MEMBERS ONLY. BRIGHT DAY; SOLAR IRRADIATION, SOLAR LOAD x 2060 BTU/HR. ELECTRICAL LOAD x 4080 BTU/HR. GALLEY LOAD x 3000 BTU/HR.

4 & 5. CABIN TEMP AT 70°F (21.1°C). NO CREW, NO PASSENGERS. DULL DAY OR NIGHT; NO SOLAR IRRADIATION, NO ELECTRICAL LOAD, NO GALLEY LOAD.

5.7 PRECONDITIONED AIRFLOW REQUIREMENTS
MODEL DC-9-51
5.8 Ground Towing Requirements

In order to determine the drawbar pull and total traction wheel load experienced by a tow vehicle, the airplane weight, pavement slope, coefficient of friction, and engine thrust must be known.

In the example for the Model DC-9, Page 158, the airplane gross weight is 82,000 pounds, the pavement slope is 2 percent, the coefficient of friction is 0.57, and there is no engine thrust. From these conditions, the drawbar pull is 4300 pounds and the total traction wheel load is 7800 pounds.
5.8 GROUND TOWING REQUIREMENTS

MODEL DC-9
6.0 OPERATING CONDITIONS

6.1 Jet Engine Exhaust Velocities and Temperatures
6.2 Airport and Community Noise
6.0 OPERATING CONDITIONS

6.1 JET ENGINE EXHAUST VELOCITIES AND TEMPERATURES

6.1.1 JET ENGINE EXHAUST VELOCITY CONTOURS, BREAKAWAY POWER DC-9 MODELS

(SERIES 10 THROUGH 50)
6.1 JET EXHAUST VELOCITIES AND TEMPERATURES
6.1.2 JET ENGINE EXHAUST TEMPERATURE CONTOURS, BREAKAWAY POWER
DC-9 MODELS
(SERIES 10 THROUGH 50)
6.1 JET ENGINE VELOCITIES AND TEMPERATURES
6.1.3 JET ENGINE EXHAUST VELOCITY CONTOURS, TAKEOFF POWER DC-9 MODELS
(SERIES 10 THROUGH 50)

NOTES:
1. THESE CONTURS ARE TO BE USED AS GUIDELINES ONLY SINCE OPERATIONAL ENVIRONMENT VARY GREATLY – OPERATIONAL SAFETY ASPECTS ARE THE RESPONSIBILITY OF THE USER/PLANNER
2. ALL VELOCITY VALUES ARE STATUTE MILES/HOUR
3. CROSSWINDS WILL HAVE CONSIDERABLE EFFECT ON CONTOURS
4. SEA LEVEL STATIC—STANDARD DAY—ZERO RAMP GRADIENT
5. ALL ENGINES AT SAME THRUST

CONVERSION FACTOR
1 MPH = 1.6 KM PER HOUR
6.1 JET ENGINE VELOCITIES AND TEMPERATURES
6.1.4 JET ENGINE EXHAUST TEMPERATURE CONTOURS, TAKEOFF POWER
DC-9 MODELS
(SERIES 10 THROUGH 50)

NOTES: 1. ALL TEMPERATURES ARE DEGREES FAHRENHEIT
2. THESE CONTOURS ARE TO BE USED AS GUIDELINES ONLY SINCE OPERATIONAL ENVIRONMENT VARIES GREATLY — OPERATIONAL SAFETY ASPECTS ARE THE RESPONSIBILITY OF THE USER/PLANNER
3. CROSSWINDS WILL HAVE CONSIDERABLE EFFECT ON CONTOURS
4. SEA LEVEL STATIC—STANDARD DAY—ZERO RAMP GRADIENT
5. ALL ENGINES AT SAME THRUST
6.1 JET ENGINE VELOCITIES AND TEMPERATURES
6.1.5 JET ENGINE EXHAUST VELOCITY CONTOURS, IDLE POWER
DC-9 MODELS
(SERIES 10 THROUGH 50)
6.1. JET ENGINE VELOCITIES AND TEMPERATURES

6.1.6 JET ENGINE EXHAUST TEMPERATURE CONTOURS, IDLE POWER DC-9 MODELS
(SERIES 10 THROUGH 50)
6.2 Airpot and Community Noise

Aircraft noise is of major concern to the airport and community planner. The airport is a major element in the community's transportation system and, as such, is vital to its growth. However, the airport must also be a good neighbor, and this can be accomplished only with proper planning. Since aircraft noise extends beyond the boundaries of the airport, it is vital to consider the impact on surrounding communities. Many means have been devised to provide the planner with a tool to estimate the impact of airport operations. Too often they oversimplify noise to the point where the results become erroneous. Noise is not a simple subject; therefore, there are no simple answers.

The cumulative noise contour is an effective tool. However, care must be exercised to ensure that the contours, used correctly, estimate the noise resulting from aircraft operations conducted at an airport.

The size and shape of the single-event contours, which are inputs into the cumulative noise contours, are dependent upon numerous factors. They include:

1. Operational Factors
   (a) Aircraft Weight — Aircraft weight is dependent on distance to be traveled, en route winds, payload, and anticipated aircraft delay upon reaching the destination.
   (b) Engine Power Settings — The rates of ascent and descent and the noise levels emitted at the source are influenced by the power setting used.
   (c) Airport Altitude — Higher airport altitude will affect engine performance and thus can influence noise.

**Condition 2**

<table>
<thead>
<tr>
<th>Landing:</th>
<th>Takeoff:</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 Percent of Maximum Structural Landing Weight</td>
<td>80 Percent of Maximum Gross Takeoff Weight</td>
</tr>
<tr>
<td>10-Knot Headwind</td>
<td>10-Knot Headwind</td>
</tr>
<tr>
<td>3-Deg Approach</td>
<td>59°F</td>
</tr>
<tr>
<td>59°F Humidity 70 Percent</td>
<td>Humidity 70 Percent</td>
</tr>
</tbody>
</table>

As indicated from these data, the contour size varies substantially with operating and atmospheric conditions. Most aircraft operations are, of course, conducted at less than maximum gross weights because average flight distances are much shorter than maximum aircraft range capability and average load factors are less than 100 percent. Therefore, in developing cumulative contours for planning purposes, it is recommended that the airlines serving a particular city be contacted to provide operational information.

In addition, there are no universally accepted methods for developing aircraft noise contours or for relating the acceptability of specific noise zones to specific land uses. It is therefore expected that noise contour data for particular aircraft and the impact assessment methodology will be changing. To ensure that currently available information of this type is used in any planning study, it is recommended that it be obtained directly from the Office of Environmental Quality in the Federal Aviation Administration in Washington, D.C.
It should be noted that the contours shown herein are only for illustrating the impact of operating and atmospheric conditions and do not represent the single-event contour of the family of aircraft described in this document. It is expected that the cumulative contours will be developed as required by planners using the data and methodology applicable to their specific study.

2. Atmospheric Conditions – Sound Propagation

(a) Wind – With stronger headwinds, the aircraft can take off and climb more rapidly relative to the ground. Also, winds can influence the distribution of noise in surrounding communities.

(b) Temperature and Relative Humidity – The absorption of noise in the atmosphere along the transmission path between the aircraft and the ground observer varies with both temperature and relative humidity.

3. Surface Condition Shielding, Extra Ground Attenuation (EGA)

(a) Terrain – If the ground slopes down after takeoff or up before landing, noise will be reduced since the aircraft will be at a higher altitude above ground. Additionally, hills, shrubs, trees, and large buildings can act as sound buffers.

All of these factors can alter the shape and size of the contours appreciably. To demonstrate the effect of some of these factors, estimated noise level contours for two different operating conditions are shown below. These contours reflect a given noise level upon a ground level plane at runway elevation.

**Condition 1**

- Landing:
  - Maximum Structural Landing Weight
  - 10-knot Headwind
  - 3-Deg Approach
  - 84°F
  - Humidity 15 Percent

- Takeoff:
  - Maximum Gross Takeoff Weight
  - Zero Wind
  - 84°F
  - Humidity 15 Percent

---

![Diagram showing Condition 1 and Condition 2](image-url)
7.0 PAVEMENT DATA

7.1 General Information
7.2 Footprint
7.3 Maximum Pavement Loads
7.4 Landing Gear Loading on Pavement
7.5 Flexible Pavement Requirements, U.S. Corps of Engineers Design Method
7.6 Flexible Pavement Requirements, LCN Conversion
7.7 Rigid Pavement Requirements, Portland Cement Association Design Method
7.8 Rigid Pavement Requirements, LCN Conversion
7.0 PAVEMENT DATA

7.1 General Information

A brief description of the pavement charts which follow will be helpful in their use for airport planning. Each airplane configuration is depicted with a range of four loads imposed on the main landing gear to aid in interpolation between the discrete values shown. All pavement requirement charts present data at a constant main gear tire pressure. The tire pressure used will produce a tire deflection of 32 percent with the airplane loaded to its maximum ramp weight, and with the C.G. at its maximum permissible aft position.

Section 7.2 presents basic data on the landing gear footprint configuration and tire sizes. Also shown are maximum ramp weights and corresponding tire pressures. Main gear tire pressures are based on the maximum permissible aft C.G. and nose gear pressures are based on a nominal C.G. position.

Section 7.3 lists maximum vertical and horizontal pavement loads at the tire ground interfaces for certain critical conditions. The number of struts per airplane is indicated by parentheses where this information is significant.

Section 7.4 provides charts which show static loads imposed on the main landing gear struts for the operational limits of the airplane. These main landing gear loads are used for the interpretation of the pavement design charts which follow.

Section 7.5 presents a pavement requirement chart for flexible pavements. Flexible pavement design curves are based upon the format and procedures set forth in Instruction Report No. S-77-1, “Procedures for Development of CBR Design Curves,” published in June 1977 by the U.S. Army Engineer Waterways Experiment Station, Soils and Pavements Laboratory, Vicksburg, Mississippi.


Section 7.7 provides rigid pavement design curves prepared with the use of the Westergaard Equations in general accordance with the relationships outlined in the 1955 edition of “Design of Concrete Airport Pavement” published by the Portland Cement Association, 33 W. Grand Ave., Chicago 10, Illinois, but modified to the new format described in the 1968 Portland Cement Association publication, “Computer Program for Airport Pavement Design” by Robert G. Packard. The following procedure is used to develop the rigid pavement design curves.

1. Having established the scale for pavement thickness to the left and the scale for allowable working stress to the right, an arbitrary load line is drawn representing the main landing gear maximum weight to be shown.

2. All values of the subgrade modulus (K-values) are then plotted using the maximum load line, as shown.

3. Additional load lines for the incremental value of weight on the main landing gear are then established on the basis of the curve for $K = 300$ PCI, already established.
Section 7.8 presents LCN conversion curves for rigid pavements. These curves have been plotted using procedures and curves in the International Civil Aviation Organization (ICAO) Aerodrome Design Manual, Part 3, "Pavements," Document 9157-AN/901, 1977 Edition. The LCN requirements are based on the condition of center of slab loading. Radius of relative stiffness values are obtained from Section 7.8.1.

On the same charts showing LCN versus equivalent single wheel load, there are load plots for airplane Model DC-9 showing equivalent single wheel load versus pavement thickness for flexible pavements and versus radius of relative stiffness for rigid pavements.

Procedures and curves provided in the ICAO Aerodrome Design Manual are used to determine equivalent single wheel loads for use in making LCN conversion of rigid pavement requirements.

It should be noted that pavement requirements are presented for loads, tires, and tire pressures presently certified for commercial usage. All curves represent data at a constant specified tire pressure.

Section 7.9 provides ACN data prepared according to the ACN-PCN system described in "Aerodromes, Annex 14 to the Convention on International Civil Aviation, Amendment 35."

ACN-PCN provides a standardized international airplane/pavement rating system replacing the various S, T, TT, LCN, AUW, ISWL, etc., rating systems used throughout the world. ACN is the Aircraft Classification Number and PCN is the corresponding Pavement Classification Number. An aircraft having an ACN equal to or less than the PCN can operate without restriction on the pavement. Numerically, the ACN is two times the derived single wheel load expressed in thousands of kilograms, where the derived single wheel load is defined as the load on a single tire inflated to 1.25 MPa (181 psi) that would have the same pavement requirements as the aircraft. Computationally, the ACN-PCN system uses PCA programs PDILB for rigid pavements and S-77-1 for flexible pavements to calculate ACN values. The method of pavement evaluation is the responsibility of the airport with the results of their evaluation presented as follows:

**REPORT EXAMPLE: PCN 80/R/B/W/T**

<table>
<thead>
<tr>
<th>PCN</th>
<th>PAVEMENT CLASSIFICATION NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS</td>
<td>(BEARING STRENGTH FOR UNRESTRICTED OPERATIONS)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>PAVEMENT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>RIGID</td>
</tr>
<tr>
<td>F</td>
<td>FLEXIBLE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>SUBGRADE CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>HIGH (K = 150 MN/m² OR CBR = 15%)</td>
</tr>
<tr>
<td>B</td>
<td>MEDIUM (K = 80 MN/m² OR CBR = 10%)</td>
</tr>
<tr>
<td>C</td>
<td>LOW (K = 40 MN/m² OR CBR = 6%)</td>
</tr>
<tr>
<td>D</td>
<td>ULTRA LOW (K = 20 MN/m² OR CBR = 3%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>TIRE PRESSURE CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>HIGH (NO LIMIT)</td>
</tr>
<tr>
<td>X</td>
<td>MEDIUM (LIMITED TO 1.75 MPa)</td>
</tr>
<tr>
<td>Y</td>
<td>LOW (LIMITED TO 1.25 MPa)</td>
</tr>
<tr>
<td>Z</td>
<td>VERY LOW (LIMITED TO 0.5 MPa)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CODE</th>
<th>EVALUATION METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>TECHNICAL</td>
</tr>
<tr>
<td>U</td>
<td>USING AIRCRAFT</td>
</tr>
</tbody>
</table>

142 REV G 7/85
### MODEL DC-9

<table>
<thead>
<tr>
<th>MAXIMUM RAMP WEIGHT</th>
<th>-15</th>
<th>-21</th>
<th>-32</th>
<th>-41</th>
<th>-51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>91,500 LB (41,504 KG)</td>
<td>101,000 LB (45,813 KG)</td>
<td>109,000 LB (49,442 KG)</td>
<td>115,000 LB (52,163 KG)</td>
<td>122,000 LB (55,338 KG)</td>
</tr>
</tbody>
</table>

**PERCENT OF WEIGHT ON MAIN GEAR**  
SEE SECTION 7.4

<table>
<thead>
<tr>
<th>NOSE TIRE SIZE</th>
<th>-15</th>
<th>-21</th>
<th>-32</th>
<th>-41</th>
<th>-51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26 x 6.6 TYPE VII</td>
<td>26 x 6.6 TYPE VII</td>
<td>26 x 6.6 TYPE VII</td>
<td>26 x 6.6 TYPE VII</td>
<td>26 x 6.6 TYPE VII</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOSE TIRE PRESSURE</th>
<th>-15</th>
<th>-21</th>
<th>-32</th>
<th>-41</th>
<th>-51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>118 PSI (8.3 KG/CM²)</td>
<td>131 PSI (9.2 KG/CM²)</td>
<td>140 PSI (9.9 KG/CM²)</td>
<td>148 PSI (10.4 KG/CM²)</td>
<td>157 PSI (11.0 KG/CM²)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAIN GEAR TIRE SIZE</th>
<th>-15</th>
<th>-21</th>
<th>-32</th>
<th>-41</th>
<th>-51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>40 x 14-16 20 PR</td>
<td>40 x 14-16 22 PR</td>
<td>40 x 14-16 24 PR</td>
<td>41 x 15-18 24 PR</td>
<td>41 x 15-18 24 PR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAIN GEAR TIRE PRESSURE</th>
<th>-15</th>
<th>-21</th>
<th>-32</th>
<th>-41</th>
<th>-51</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>130 PSI (9.1 KG/CM²)</td>
<td>143 PSI (10.1 KG/CM²)</td>
<td>155 PSI (10.9 KG/CM²)</td>
<td>160 PSI (11.3 KG/CM²)</td>
<td>172 PSI (12.1 KG/CM²)</td>
</tr>
</tbody>
</table>

### FOOTPRINT

**MODEL DC-9**

- DC-9-15 24 IN. (61 CM)
- DC-9-21 25 IN. (64 CM)
- DC-9-32 25 IN. (64 CM)
- DC-9-41 26 IN. (66 CM)
- DC-9-51 26 IN. (66 CM)

14 IN. (0.36 M) ALL MODELS

DC-9-15 43 FT 8 IN. (13.31 M)
DC-9-21 43 FT 8 IN. (13.31 M)
DC-9-32 53 FT 2 IN. (16.21 M)
DC-9-41 56 FT 2 IN. (17.12 M)
DC-9-51 60 FT 11 IN. (18.56 M)

DC-9-15 16 FT 4 IN. (4.98 M)
DC-9-21 16 FT 4 IN. (4.98 M)
DC-9-32 16 FT 4 IN. (4.98 M)
DC-9-41 16 FT 0 IN. (4.88 M)
DC-9-51 16 FT 0 IN. (4.88 M)
7.2.1 TIRE INFLATION CHART – MODELS DC-9-15, -21, -32, -41, -51
**LEGEND:**

\( V_{NG} \) = MAXIMUM VERTICAL NOSE GEAR GROUND LOAD AT MOST FORWARD C.G.

\( V_{MG} \) = MAXIMUM VERTICAL MAIN GEAR GROUND LOAD AT MOST AFT C.G.

\( H \) = MAXIMUM HORIZONTAL GROUND LOAD FROM BRAKING

**NOTE:** ALL LOADS CALCULATED USING AIRPLANE MAXIMUM GROSS WEIGHT

---

![Diagram of aircraft]

---

<table>
<thead>
<tr>
<th>MODEL DC-9</th>
<th>MAXIMUM GROSS WEIGHT</th>
<th>( V_{NG} ) FORWARD CG</th>
<th>( V_{MG} ) PER STRUT (2), AFT CG</th>
<th>( H ) PER STRUT (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>STATIC</td>
<td>STEADY BRAKING*</td>
<td>STATIC</td>
</tr>
<tr>
<td></td>
<td>LB</td>
<td>LB</td>
<td>KG</td>
<td>LB</td>
</tr>
<tr>
<td>-15</td>
<td>91,500</td>
<td>8,844</td>
<td>4,012</td>
<td>14,810</td>
</tr>
<tr>
<td>-21</td>
<td>101,000</td>
<td>11,443</td>
<td>5,190</td>
<td>18,028</td>
</tr>
<tr>
<td>-32</td>
<td>109,000</td>
<td>11,477</td>
<td>5,206</td>
<td>17,313</td>
</tr>
<tr>
<td>-41</td>
<td>115,000</td>
<td>11,391</td>
<td>5,167</td>
<td>17,220</td>
</tr>
<tr>
<td>-51</td>
<td>122,000</td>
<td>11,773</td>
<td>5,340</td>
<td>16,549</td>
</tr>
</tbody>
</table>

*10 ft/sec² DECELERATION DUE ONLY TO BRAKING

---

**7.3 MAXIMUM PAVEMENT LOADS**

**MODEL DC-9**

---

145
7.4 LANDING GEAR LOADING ON PAVEMENT
MODEL DC-9-15
NOTE: UNSHADED AREAS REPRESENT OPERATIONAL LIMITS

7.4 LANDING GEAR LOADING ON PAVEMENT
MODEL DC-9-21
NOTE: UNSHADED AREAS REPRESENT OPERATIONAL LIMITS

TOTAL WEIGHT ON TWO MAIN LANDING GEARS (1000 POUNDS)

MAX. RAMP WEIGHT 109,000 LB

AIRPLANE GROSS WEIGHT (1000 POUNDS)

7.4 LANDING GEAR LOADING ON PAVEMENT
MODEL DC-9-32
7.4 LANDING GEAR LOADING ON PAVEMENT
MODEL DC-9-41
7.4 LANDING GEAR LOADING ON PAVEMENT
MODEL DC-9-51
7.5 Flexible Pavement Requirements – U.S. Army Corps of Engineers Method (S-77-1)

The flexible pavement design chart is prepared for standard-pressure tires. This chart presents the data for incremental maingear weights as well as the maximum ramp weight of each model.

In the example shown on the next page, for a CBR of 7.0 and an annual departure level of 6000, the required flexible pavement thickness for an airplane with a maingear loading of 70,000 pounds is 20.0 inches.

The line showing 10,000 coverages is used for ACN calculations.
40 x 14.16 AND 41 x 15-18 TIRES
TIRE PRESSURE RANGE: 130 TO 172 PSI
CALIFORNIA BEARING RATIO (CBR)

FLEXIBLE PAVEMENT REQUIREMENTS –
U.S. ARMY CORPS OF ENGINEERS DESIGN
METHOD (S-77-1)
MODELS DC-9-15, -21, -32, -41, -51

REV G 7/85
7.6 Flexible Pavement Requirements, LCN Conversion

In order to determine the airplane weight that can be accommodated on a particular flexible airport pavement, both the LCN of the pavement and the thickness (h) of the pavement must be known.

In the example for the Model DC-9-15, the flexible pavement thickness is 25 inches and the LCN is 39. For these conditions, the weight on the main landing gear is 75,000 pounds.

Note: If the resultant aircraft LCN is not more than 10 percent above the published pavement LCN, it is the United Kingdom's view that the bearing strength of the pavement can be considered sufficient for unlimited use by the airplane. The figure of 10 percent has been chosen as representing the lowest degree of variation in LCN that is significant. (Reference: ICAO Aerodrome Design Manual, Paragraph 3.5.2, 1977 Edition.)
EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL.

40 x 14 TIRES -- TIRE PRESSURE CONSTANT AT 130 PSI (9.1 KG/CM²)

7.6 FLEXIBLE PAVEMENT REQUIREMENTS - LCN CONVERSION
MODEL DC-9-15
7.6 FLEXIBLE PAVEMENT REQUIREMENTS - LCN CONVERSION
MODEL DC-9-21
NOTE: EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL.

40 x 14 TIRES – TIRE PRESSURE CONSTANT AT 155 PSI (10.9 KG/CM²)

TOTAL WEIGHT ON TWO MAIN LANDING GEARS
100,725 LB (45,688 KG)
90,000 LB (40,823 KG)
80,000 LB (36,287 KG)
70,000 LB (31,751 KG)

MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAX RAMP WEIGHT AND AFT CG (SEC 7.4)

EQUIVALENT SINGLE WHEEL LOAD (1000 LB)

FLEXIBLE PAVEMENT THICKNESS (INCHES)
INCHES x 2.54 = CENTIMETERS

LOAD CLASSIFICATION NUMBER (LCN)

7.6 FLEXIBLE PAVEMENT REQUIREMENTS – LCN CONVERSION MODEL DC-9-32
41 x 15 TIRES – TIRE PRESSURE CONSTANT AT 160 PSI (11.3 KG/CM²)

NOTE: EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL.

TOTAL WEIGHT ON TWO MAIN LAND NG GEARS

MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAX RAMP WEIGHT AND AFT CG (SEC 7.4)

EQUIVALENT SINGLE WHEEL LOAD (1000 LB)

FLEXIBLE PAVEMENT THICKNESS (INCHES)

INCHES * 2.54 = CENTIMETERS

LOAD CLASSIFICATION NUMBER (LCN)

7.6 FLEXIBLE PAVEMENT REQUIREMENTS – LCN CONVERSION
MODEL DC-9-41
NOTE: EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL.

41 x 15 TIRES – TIRE PRESSURE CONSTANT AT 172 PSI (12.1 KG/CM²)

TOTAL WEIGHT ON TWO MAIN LANDING GEARS

- 114,000 LB (51,982 KG)
- 100,000 LB (45,359 KG)
- 80,000 LB (36,287 KG)
- 60,000 LB (27,216 KG)

MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAX RAMP WEIGHT AND AFT CG (SEC 7.4)

EQUIVALENT SINGLE WHEEL LOAD (1000 LB)

FLEXIBLE PAVEMENT THICKNESS (INCHES)
INCHES x 2.54 = CENTIMETERS

LOAD CLASSIFICATION NUMBER (LCN)

20 30 40 50 60 70 80 90

15 20 25

20 15 10 5

7.6 FLEXIBLE PAVEMENT REQUIREMENTS – LCN CONVERSION MODEL DC-9-51
7.7 Rigid Pavement Requirements, Portland Cement Association Design Method

In order to determine the airplane weight that can be accommodated on a particular rigid pavement, the thickness (h) of the pavement, the subgrade modulus (k) and the allowable working stress must be known.

In the example for the Model DC-9-15, the rigid pavement thickness is 8 inches, the subgrade modulus is 300, and the allowable working stress is 476 psi. For these conditions, the weight on the main landing gear is 84,880 pounds.
NOTE: THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUE OF K ARE EXACT. FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR K = 300, BUT DEVIATE SLIGHTLY FOR OTHER VALUES OF K.

REFERENCE: "DESIGN OF CONCRETE AIRPORT PAVEMENT" AND COMPUTER PROGRAM FOR PAVEMENT DESIGN," (PROGRAM PDILB) PORTLAND CEMENT ASSOCIATION

7.7 RIGID PAVEMENT REQUIREMENTS, PORTLAND CEMENT ASSOCIATION DESIGN METHOD
MODEL DC-9-15
7.7 RIGID PAVEMENT REQUIREMENTS, PORTLAND CEMENT ASSOCIATION DESIGN METHOD
MODEL DC-9-21

NOTE: THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUE OF K ARE EXACT. FOR LOADS LESS THAN MAXIMUM, THE CURVES ARE EXACT FOR K = 300, BUT DEVIATE SLIGHTLY FOR OTHER VALUES OF K.

REFERENCE: "DESIGN OF CONCRETE AIRPORT PAVEMENT" AND "COMPUTER PROGRAM FOR PAVEMENT DESIGN," (PROGRAM PDILB) PORTLAND CEMENT ASSOCIATION
7.7 Rigid Pavement Requirements, Portland Cement Association Design Method
Model DC-9-32
7.7 RIGID PAVEMENT REQUIREMENTS, PORTLAND CEMENT ASSOCIATION DESIGN METHOD
MODEL DC-9-41
NOTE: THE VALUES OBTAINED BY USING THE MAXIMUM LOAD REFERENCE LINE AND ANY VALUE OF K ARE EXACT FOR LOADS LESS THAN MAXIMUM. THE CURVES ARE EXACT FOR K = 300, BUT DEViate SLIGHTLY FOR OTHER VALUES OF K.

REFERENCE: "DESIGN OF CONCRETE AIRPORT PAVEMENT" AND COMPUTER PROGRAM FOR PAVEMENT DESIGN," (PROGRAM PDILB) PORTLAND CEMENT ASSOCIATION

7.7 RIGID PAVEMENT REQUIREMENTS, PORTLAND CEMENT ASSOCIATION DESIGN METHOD
MODEL DC-9-51
7.8 Rigid Pavement Requirements, LCN Conversion

In order to determine the airplane weight that can be accommodated on a particular rigid airport pavement, both the LCN of the pavement and the radius of relative stiffness must be known.

In the example for the Model DC-9-15, the rigid pavement radius of relative stiffness is 52 inches, and the LCN is 35. For these conditions, the weight on the main landing gear is 65,000 pounds.

The LCN charts use \( k \)-values based on Young’s Modulus (E) of 4,000,000 psi and Poisson’s Ratio (\( \mu \)) of 0.15. For convenience in finding \( k \)-values based on other values of E and \( \mu \), the curves in Subsections 7.8.1 and 7.8.2 are included. For example, to find an \( k \)-value based on an E of 3,000,000 psi the “E” factor of 0.931 is multiplied by the \( k \)-value found in Table 7.8.1. The effect of variations of “\( \mu \)” on the \( k \)-value is treated in a similar manner.

Note: If the resultant aircraft LCN is not more than 10 percent above the published pavement LCN, it is the United Kingdom’s view that the bearing strength of the pavement can be considered sufficient for unlimited use by the airplane. The figure of 10 percent has been chosen as representing the lowest degree of variation in LCN which is significant. (Reference: ICAO Aerodrome Design Manual, Paragraph 3.5.2, 1977 Edition.)
NOTE: EQUIVALENT SINGLE WHEEL LOADS ARE DERIVED BY METHODS SHOWN IN ICAO AERODROME MANUAL.

40 x 14 TIRES – TIRE PRESSURE CONSTANT AT 130 PSI (9.1 KG/CM²)

MAXIMUM POSSIBLE MAIN GEAR LOAD AT MAX RAMP WEIGHT AND AFT CG (SEC 7.4)

TOTAL WEIGHT ON TWO MAIN LANDING GEARS

84,876 LB
(38,499 KG)

75,000 LB
(34,019 KG)

65,000 LB
(29,483 KG)

55,000 LB
(24,948 KG)

EQUIVALENT SINGLE WHEEL LOAD (1000 LB)

RADIUS OF RELATIVE STIFFNESS (k)

LOAD CLASSIFICATION NUMBER (LCN)

EQUIVALENT SINGLE WHEEL LOAD (1000 KG)

7.8 RIGID PAVEMENT REQUIREMENTS, LCN CONVERSION MODEL DC-9-15
7.8 RIGID PAVEMENT REQUIREMENTS, LCN CONVERSION
MODEL DC-9-21
7.8 RIGID PAVEMENT REQUIREMENTS, LCN CONVERSION
MODEL DC-9-32
7.8 RIGID PAVEMENT REQUIREMENTS, LCN CONVERSION
MODEL DC-9-41
7.8 RIGID PAVEMENT REQUIREMENTS, LCN CONVERSION
MODEL DC-9-51
7.8.1 Radius of Relative Stiffness (Other values of E and f)

The chart of Section 7.8 presents \( \ell \)-values based on Young's Modulus (E) of 4,000,000 psi and Poisson's Ratio (\( \mu \)) of 0.15. For convenience in finding \( \ell \)-values based on other values of E and \( \mu \) the curves of Section 7.8.1 are included. For example, to find an \( \ell \)-value based on an E of 3,000,000 psi, the "E" factor of 0.931 is multiplied by the \( \ell \)-value found in the table of Section 7.8.1. The effect of variations of "\( \mu \)" on the \( \ell \)-value is treated in a similar manner.
RADIUS OF RELATIVE STIFFNESS ($f$)
VALUES OF $f$ IN INCHES
FOR $E = 4,000,000$ P.S.I. AND $\mu = 0.15$

\[
f = \sqrt[3]{\frac{E_a^3}{12(1-\mu^2)k}} = 24.1652 \sqrt[3]{\frac{E_a^3}{k}}
\]

<table>
<thead>
<tr>
<th>$d$ in in.</th>
<th>k=50</th>
<th>k=100</th>
<th>k=150</th>
<th>k=200</th>
<th>k=250</th>
<th>k=300</th>
<th>k=350</th>
<th>k=400</th>
<th>k=500</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>34.84</td>
<td>29.30</td>
<td>26.47</td>
<td>24.63</td>
<td>23.30</td>
<td>22.26</td>
<td>21.42</td>
<td>20.72</td>
<td>19.59</td>
</tr>
<tr>
<td>6.5</td>
<td>36.99</td>
<td>31.11</td>
<td>28.11</td>
<td>26.16</td>
<td>24.74</td>
<td>23.64</td>
<td>22.74</td>
<td>22.00</td>
<td>20.80</td>
</tr>
<tr>
<td>7.5</td>
<td>41.19</td>
<td>34.63</td>
<td>31.29</td>
<td>29.12</td>
<td>27.54</td>
<td>26.22</td>
<td>25.32</td>
<td>24.49</td>
<td>23.16</td>
</tr>
<tr>
<td>8</td>
<td>43.23</td>
<td>36.35</td>
<td>32.85</td>
<td>30.57</td>
<td>28.91</td>
<td>27.62</td>
<td>26.68</td>
<td>25.70</td>
<td>24.31</td>
</tr>
<tr>
<td>8.5</td>
<td>45.24</td>
<td>38.04</td>
<td>34.37</td>
<td>31.99</td>
<td>30.25</td>
<td>28.91</td>
<td>27.81</td>
<td>26.90</td>
<td>25.44</td>
</tr>
<tr>
<td>9</td>
<td>47.22</td>
<td>39.71</td>
<td>35.88</td>
<td>33.39</td>
<td>31.58</td>
<td>30.17</td>
<td>29.03</td>
<td>28.08</td>
<td>26.65</td>
</tr>
<tr>
<td>9.5</td>
<td>49.17</td>
<td>41.36</td>
<td>37.36</td>
<td>34.77</td>
<td>32.89</td>
<td>31.42</td>
<td>30.23</td>
<td>29.24</td>
<td>27.65</td>
</tr>
<tr>
<td>10</td>
<td>51.10</td>
<td>42.97</td>
<td>38.83</td>
<td>36.14</td>
<td>34.17</td>
<td>32.85</td>
<td>31.42</td>
<td>30.30</td>
<td>28.74</td>
</tr>
<tr>
<td>10.5</td>
<td>53.01</td>
<td>44.57</td>
<td>40.28</td>
<td>37.48</td>
<td>35.46</td>
<td>33.87</td>
<td>32.59</td>
<td>31.52</td>
<td>29.81</td>
</tr>
<tr>
<td>11</td>
<td>54.89</td>
<td>46.16</td>
<td>41.71</td>
<td>38.81</td>
<td>36.71</td>
<td>35.07</td>
<td>33.75</td>
<td>32.64</td>
<td>30.87</td>
</tr>
<tr>
<td>11.5</td>
<td>56.75</td>
<td>47.72</td>
<td>43.12</td>
<td>40.13</td>
<td>37.95</td>
<td>36.26</td>
<td>34.89</td>
<td>33.74</td>
<td>31.91</td>
</tr>
<tr>
<td>12</td>
<td>58.59</td>
<td>49.27</td>
<td>44.52</td>
<td>41.43</td>
<td>39.18</td>
<td>37.44</td>
<td>36.02</td>
<td>34.84</td>
<td>32.95</td>
</tr>
<tr>
<td>12.5</td>
<td>60.41</td>
<td>50.80</td>
<td>45.90</td>
<td>42.72</td>
<td>40.40</td>
<td>38.60</td>
<td>37.14</td>
<td>36.92</td>
<td>34.97</td>
</tr>
<tr>
<td>13</td>
<td>62.22</td>
<td>52.32</td>
<td>47.27</td>
<td>43.98</td>
<td>41.61</td>
<td>39.75</td>
<td>38.25</td>
<td>36.99</td>
<td>34.99</td>
</tr>
<tr>
<td>13.5</td>
<td>64.00</td>
<td>53.82</td>
<td>48.63</td>
<td>45.26</td>
<td>42.80</td>
<td>40.89</td>
<td>39.36</td>
<td>38.06</td>
<td>36.99</td>
</tr>
<tr>
<td>14</td>
<td>65.77</td>
<td>55.31</td>
<td>49.98</td>
<td>46.51</td>
<td>43.98</td>
<td>42.02</td>
<td>40.44</td>
<td>39.11</td>
<td>36.99</td>
</tr>
<tr>
<td>14.5</td>
<td>67.53</td>
<td>56.78</td>
<td>51.31</td>
<td>47.75</td>
<td>46.16</td>
<td>43.15</td>
<td>41.51</td>
<td>40.15</td>
<td>37.97</td>
</tr>
<tr>
<td>15</td>
<td>69.27</td>
<td>58.26</td>
<td>52.63</td>
<td>48.98</td>
<td>46.32</td>
<td>44.26</td>
<td>42.58</td>
<td>41.19</td>
<td>38.96</td>
</tr>
<tr>
<td>15.5</td>
<td>70.99</td>
<td>59.70</td>
<td>53.94</td>
<td>50.20</td>
<td>47.47</td>
<td>45.36</td>
<td>43.64</td>
<td>42.21</td>
<td>39.92</td>
</tr>
<tr>
<td>16</td>
<td>72.70</td>
<td>61.13</td>
<td>55.24</td>
<td>51.41</td>
<td>48.62</td>
<td>46.45</td>
<td>44.70</td>
<td>43.23</td>
<td>40.88</td>
</tr>
<tr>
<td>16.5</td>
<td>74.40</td>
<td>62.56</td>
<td>56.53</td>
<td>52.61</td>
<td>49.75</td>
<td>47.54</td>
<td>45.74</td>
<td>44.24</td>
<td>41.84</td>
</tr>
<tr>
<td>17</td>
<td>76.08</td>
<td>63.98</td>
<td>57.81</td>
<td>53.80</td>
<td>50.88</td>
<td>48.61</td>
<td>46.77</td>
<td>45.24</td>
<td>42.78</td>
</tr>
<tr>
<td>17.5</td>
<td>77.75</td>
<td>65.38</td>
<td>59.08</td>
<td>54.98</td>
<td>52.00</td>
<td>49.88</td>
<td>47.80</td>
<td>46.30</td>
<td>43.72</td>
</tr>
<tr>
<td>18</td>
<td>79.41</td>
<td>66.78</td>
<td>60.34</td>
<td>56.16</td>
<td>53.11</td>
<td>50.74</td>
<td>48.62</td>
<td>47.22</td>
<td>44.66</td>
</tr>
<tr>
<td>18.5</td>
<td>82.70</td>
<td>69.54</td>
<td>62.84</td>
<td>58.48</td>
<td>55.31</td>
<td>52.84</td>
<td>50.84</td>
<td>49.17</td>
<td>46.51</td>
</tr>
<tr>
<td>19</td>
<td>85.96</td>
<td>72.27</td>
<td>65.30</td>
<td>60.77</td>
<td>57.47</td>
<td>54.91</td>
<td>52.84</td>
<td>51.10</td>
<td>48.33</td>
</tr>
<tr>
<td>19.5</td>
<td>89.15</td>
<td>74.96</td>
<td>67.74</td>
<td>63.04</td>
<td>59.62</td>
<td>56.96</td>
<td>54.81</td>
<td>53.01</td>
<td>50.13</td>
</tr>
<tr>
<td>20</td>
<td>92.31</td>
<td>77.63</td>
<td>70.14</td>
<td>65.28</td>
<td>61.73</td>
<td>58.98</td>
<td>56.75</td>
<td>54.89</td>
<td>51.91</td>
</tr>
<tr>
<td>20.5</td>
<td>95.44</td>
<td>80.26</td>
<td>72.52</td>
<td>67.49</td>
<td>63.83</td>
<td>60.98</td>
<td>58.68</td>
<td>56.75</td>
<td>53.67</td>
</tr>
</tbody>
</table>

7.8.1 RADIUS OF RELATIVE STIFFNESS
(REFERENCE: PORTLAND CEMENT ASSOCIATION)
7.8.2 EFFECT OF E AND $\mu$ ON $\ell$ VALUES

NOTE:

BOTH CURVES ON THIS PAGE ARE USED TO ADJUST THE $\ell$-VALUES OF THE TABLE OF SECTION 7.8.1
7.9 ACN-PCN Reporting System: Flexible and Rigid Pavements

To determine the ACN of an aircraft on flexible or rigid pavement, both the aircraft gross weight and the subgrade strength category must be known. For an aircraft gross weight of 95,000 pounds and medium subgrade strength, the ACN for flexible pavement is 23. The ACN for rigid pavement for the same gross weight is 26.5.

Note: An aircraft with an ACN equal to or less than the reported PCN can operate on the pavement subject to any limitations on the tire pressure.
7.9 AIRCRAFT CLASSIFICATION NUMBER

7.9.1 FLEXIBLE PAVEMENT

MODELS DC-9-15, -21, -32, -41, -51
7.9 AIRCRAFT CLASSIFICATION NUMBER
7.9.2 RIGID PAVEMENT
MODELS DC-9-15, -21, -32, -41, -51
7.9.1 Development of ACN Charts

The ACN charts for flexible and rigid pavements were developed by methods referenced in ICAO Annex 14. The procedures to develop these charts are also described below.

The following procedure is used to develop the flexible-pavement ACN charts already shown in this subsection.

1. Determine the percentage of weight on the main gear to be used below in steps 2, 3, and 4 below. It is the maximum aft center of gravity position that yields the critical loading on the critical gear (see Section 7.4). This center of gravity position is used to determine main-gear loads at all gross weights of the model being considered.

2. Establish a flexible-pavement requirements chart using the S-77-1 design method, such as shown on the right-hand side of 7.9.3. Use standard subgrade strengths of CBR 3, 5, 10, and 15 percent and 10,000 coverages. This chart provides the same thickness values as those of Subsection 7.5, but is presented here in a different format.

3. Determine reference thickness values from the pavement requirements chart of step 2 for each standard subgrade strength and gear loading.

4. Enter the reference thickness values into the ACN flexible-pavement conversion chart shown on the left-hand side of page 7.9.3 to determine ACN. This chart was developed using the S-77-1 design method with a single tire inflated to 1.25 MPa (181 psi) pressure and 10,000 coverages. The ACN is two times the derived single-wheel load expressed in thousands of kilograms. These values of ACN were plotted as functions of aircraft gross weight, as already shown.

The following procedure is used to develop the rigid-pavement ACN charts already shown in this subsection:

1. Determine the percentage of weight on the main gear to be used in steps 2, 3, and 4 below. It is the maximum aft center of gravity position that yields the critical loading on the critical gear (see Section 7.4). This center of gravity position is used to determine main-gear loads at all gross weights of the model being considered.

2. Establish a rigid-pavement-requirements chart using the PCA computer program PDILB, such as shown on the right-hand side of 7.9.4. Use standard subgrade strengths of $k = 75, 150, 300, and 550$ pci (nominal values for $k = 20, 40, 80, 150$ MN/m$^3$). This chart provides the same thickness values as those of Subsection 7.7.

3. Determine reference thickness values from the pavement requirements chart of step 2 for each standard subgrade strength and gear loading at 400 psi working stress (nominal value for 2.75 MPa working stress).
4. Enter the reference thickness values into the ACN rigid-pavement conversion chart shown on the left-hand side of 7.9.4 to determine ACN. This chart was developed using the PCA computer program PDILB with a single tire inflated to 1.25 MPa (181 psi) pressure and a working stress of 400 psi. The ACN is two times the derived single-wheel load expressed in thousands of kilograms. These values of ACN were plotted as functions of aircraft gross weight, as already shown in this subsection.
7.9 AIRCRAFT CLASSIFICATION NUMBER
7.9.3 DEVELOPMENT OF AIRCRAFT CLASSIFICATION NUMBER (ACN) – FLEXIBLE PAVEMENT
7.9 AIRCRAFT CLASSIFICATION NUMBER
7.9.4 DEVELOPMENT OF AIRCRAFT CLASSIFICATION NUMBER (ACN) – RIGID PAVEMENT

ACN RIGID PAVEMENT CONVERSION CHART
REFERENCE: ICAO ANNEX 14 AMENDMENT 35
8.0 POSSIBLE DC-9 DERIVATIVE AIRPLANES
8.0 POSSIBLE DC-9 DERIVATIVE AIRPLANES

The derivative potential of the DC-9 is under continuing assessment. However, since late Model DC-9 series aircraft have been redesignated as the MD series aircraft, all future derivatives will have the MD designation.
9.0 SCALE DRAWINGS
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)

H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-15
SCALE:  1 IN. = 100 FT.*

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

**LEGEND**

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL—GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82⁰, 75⁰, 70⁰, 65⁰, 60⁰, 55⁰, 50⁰, 45⁰, 40⁰

9.0 SCALE DRAWINGS
DC-9-15

REV F 5/84  185
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-15
186
REV F 5/84
SCALE: 1 TO 1000

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

**LEGEND**

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-15

REV F 5/84
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
D. ELECTRICAL – GROUND POWER
E. PRESSURE REFUELING POINTS (1)
F. GRAVITY REFUELING POINTS (2)
G. POTABLE WATER

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-21

REV 5/84
SCALE: 1 IN. = 100 FT.*

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

**LEGEND**

A. PRECONDITIONED AIR  
B. MAIN CARGO DOOR  
C. FWD, AFT CARGO DOORS  
E. ELECTRICAL — GROUND POWER  
F. PRESSURE REFUELING POINTS (1)  
G. GRAVITY REFUELING POINTS (2)  
H₂O POTABLE WATER (2)  
L. LAVATORY (1)  
MLG MAIN LANDING GEAR  
NG NOSE LANDING GEAR  
P. PNEUMATIC POWER  
X. PASSENGER DOOR  

TURNING RADIUS POINTS, +  
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS  
DC-9-21

190
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-21

191
SCALE: 1 TO 1000

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

**LEGEND**

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL - GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-21

192
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)

H₂O POTABLE WATER (2)
L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°, 35°, 30°

9.0 SCALE DRAWINGS
DC-9-32

194
SCALE: 1 IN. = 100 FT.

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

LEGEND
A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H₂O POTABLE WATER (2)
L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°, 35°, 30°

9.0 SCALE DRAWINGS
DC-9-32

REV F 5/84 195
SCALE: 1 TO 500

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL - GROUND POWER
F. PRESSURE REFueling POINTS (1)
G. GRAVITY REFueling POINTS (2)

H₂O POTABLE WATER (2)
L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°, 35°, 30°

9.0 SCALE DRAWINGS
DC-9-32

196
*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)

H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°, 35°, 30°

9.0 SCALE DRAWINGS
DC-9-32
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-41
198
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-41
SCALE: 1 IN. = 100 FT.*

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
D. ELECTRICAL – GROUND POWER
E. PRESSURE REFUELING POINTS (1)
F. GRAVITY REFUELING POINTS (2)
G. H2O POTABLE WATER (2)
L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-41
SCALE: 1 TO 500

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
D. ELECTRICAL — GROUND POWER
E. PRESSURE REFUELING POINTS (1)
F. GRAVITY REFUELING POINTS (2)
H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-41
*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

**LEGEND**

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)

H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-41
LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H2O POTABLE WATER

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-51
SCALE: 1 IN. = 50 FT

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H\textsubscript{2}O POTABLE WATER
L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR
Y. SERVICE DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-51

204

REV F 5/ 84
SCALE: 1 IN. = 100 FT.

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

**LEGEND**

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82⁰, 75⁰, 70⁰, 65⁰, 60⁰, 55⁰, 50⁰, 45⁰, 40⁰

9.0 SCALE DRAWINGS
DC-9-51

REV F 84 205
SCALE: 1 TO 500

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
D. ELECTRICAL - GROUND POWER
E. PRESSURE REFUELING POINTS (1)
F. GRAVITY REFUELING POINTS (2)
G. H₂O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-51

206
SCALE: 1 TO 1000

*SEE OTHER PAGES IN THIS SECTION FOR SERVICE POINT LOCATIONS.

LEGEND

A. PRECONDITIONED AIR
B. MAIN CARGO DOOR (NONE)
C. FWD, AFT CARGO DOORS
E. ELECTRICAL – GROUND POWER
F. PRESSURE REFUELING POINTS (1)
G. GRAVITY REFUELING POINTS (2)
H2O POTABLE WATER (2)

L. LAVATORY (1)
MLG MAIN LANDING GEAR
NG NOSE LANDING GEAR
P. PNEUMATIC POWER
X. PASSENGER DOOR

TURNING RADIUS POINTS, +
82°, 75°, 70°, 65°, 60°, 55°, 50°, 45°, 40°

9.0 SCALE DRAWINGS
DC-9-51

REV F5/84  207